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THE PSYCHOLOGICAL REVIEW.

ON CERTAIN HINDRANCES TO THE PROGRESS OF PSYCHOLOGY IN AMERICA.[1]

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The progress of any of the positive sciences is always dependent upon the personal characteristics of the men devoted to the special science, quite as much as upon any other condition. The history of their development in the past would show this statement to be true even in the case of those sciences which are most independent of all subjective influences. A survey of all the favorable and unfavorable conditions under which astronomy, physics, chemistry and biology are developing at the present time—in spite of the enormous recent increase in the importance of instrumentation and technique—does not, I believe, throw discredit upon the value of personal characteristics. It is, after all, the quality of its scientific men which largely or chiefly determines whether the rate of scientific progress shall be rapid or slow in any particular age.

If this dependence on the character of the mind which goes into them is obvious for the physico-chemical sciences, it may be taken for granted as the chief condition determining the rate of the progress of psychological science. For psychology is the science of mind—of the mental life and mental development of the individual man; it is, therefore, in its essential nature, more influenced than are the physico-chemical sciences by the kind of a mind that undertakes to deal scientifically with the things

[1] Read before the American Psychological Association, New York, December, 1898.

of the mind. Its method, moreover, is such as to lay emphasis, in respect of content, upon a rich experience of knowledge, sentiment and practical activities; and, in respect of way of approach, upon training in introspective analytics and in hermeneutical skill. Sympathy with all that is really human, and experience which covers all which is essentially human; these are indispensable qualifications of the high-class psychologist. In psychology, *personnel* and *matériel* are most intimately allied.

I am going to undertake an ungrateful task, and one which cannot expect to appeal strongly to the sympathies of my audience; perhaps it cannot even get its conclusions accredited by them as having a basis of accepted facts. For this reason the undertaking may fitly begin with a few words of more or less abject apology. And, first, what will be said cannot be proved true either by demonstration or by induction; and to attempt its proof by the method of illustration would be, of all ways, most unfortunate. Its value can be, at most, only such as may be accorded to the opinions of one who has been watching the course of psychological science in this country, from an interior point of view, during a score of years. The opinion you are respectfully asked to consider may be briefly summarized as follows: As compared with the increase in number of trained teachers and investigators, and in the amount and quality of laboratory and other equipment, the *science* of psychology is not making with us the progress which may rightfully be expected of it. When inquiry is made, however, into the hindrances of progress, and after due allowance for the intrinsic difficulties of the science and for all the remaining deficiencies in equipment, it is found that one of these hindrances consists in the limited and faulty qualifications of psychologists.

The grounds for this state of my own belief I shall now proceed to make clear in several particulars. And though my theme concern personal qualifications, I distinctly disclaim all intentional personalities.

The first hindrance to the progress of psychology in America to which I wish to call attention is an excessive aloofness from, and a consequent ignorance of, the real mental life and mental

development of the average human being. Now, we psychologists may define the subject matter of our science and limit its special problems as we please; and I have nothing to urge against, but much to say in favor of, the high specialization and careful experimental methods of modern psychology. At the same time, where such specialization is not based upon, and constantly united with, an ever widening and more sympathetic acquaintance with many men of many kinds, its results are unsatisfactory. This is likely to be true both from the scientific and from the practical points of view. If I may be allowed an old-fashioned term—which is, however, just as valuable and significant now as it ever was—psychology is nothing but the descriptive and explanatory study of the '*souls*' of men. And there is no way of knowing what souls are, and can do, which does not involve the interpretation, in terms of one's own self-consciousness, of the physical signs given of the conscious state of other souls. The psychologist, then, who is a *mere* experimentalist, or a *mere* scholastic student and teacher, or a *mere* reader of books, does not know thoroughly his business. For his business *is* human nature; and human nature shows itself, as it really is, only to the man who, having it all in himself and having a trained self-knowledge, is fitted to observe, and to interpret, and to theorize upon, the natures of his fellow-men.

> *"Willst du dich selber erkennen, so sieh wie die Anderen es treiben;*
> *Willst du die Anderen verstehn, blick in dein eigenes Herz."*

Whatever may be said in depreciation of the so-called 'old psychology,' it cannot be denied that its more permanent and rapid gains were largely due to the fact that the problems of the human soul have enlisted the efforts of so many men widely acquainted with, and sympathetically interested in, the whole body of their fellow-men. The knowledge of human mental life and development which is obtained by experience only with certain classes of people, or with certain aspects of human nature, is, indeed, usually prejudiced, narrow, and not entitled to credit for its scientific character. But it all furnishes invaluable material for the scientific psychologist. The man of business, the physician, the pastor, the police judge or keeper of

the jail, and even the gambler, the tramp, the prostitute, knows something that answers to fact and to reality about the soul of man. This knowledge, too, has a bearing upon the problems of the school.

In my judgment—to cite one or more examples—it is not scientific, not to say ethically proper, without knowing what observers of human nature in the large know, to establish determinism on the basis of a few thousand reactions in the psychological laboratory; or to resolve the moral and religious sentiments of humanity into modifications of the pleasure-pains; or to deny the rights of that instinctive metaphysics without which the 'man of the school' is justly deemed by the 'man of affairs' to be lacking in 'common sense.'

The soul of man is no simple equation to be stated in terms of the 'differentiation,' 'aggregation,' 'redintegration,' of sensational factors. Its manifold beliefs, fears, hopes, aspirations, and even cognitions, that take hold on what is forever hidden from sense, and yet give support and value to sensation itself, are integral 'moments' in its own being. The scientific psychologist, much more than the Latin poetizer, is committed to the principle of not esteeming anything human foreign to himself. And while he must, of course, restrict his more special investigations to comparatively narrow lines, if this is done in the spirit of aloofness from, or in ignorance of, the actual human nature of the multitude of men, he cannot claim to have the best fitness for the pursuit of his chosen science. Above all other hindrances will the genuine student of psychology dread the limitations of academic narrowness and bigotry. For him the worst of slaveries is to be confined by the bands of the scholastic temper and habit of life. Better the ornithologist who knows nothing of birds in the wild wood, or the geologist who has studied only the collections of his college museum, or the anatomist who has dissected only the manikin of his medical school, or the artist who knows only the artificial poses of his favorite model, than the psychologist who has no wider acquaintance with the souls of men than the laboratory, or the class-room, or the book of his favorite author, can give him.

The teachers of psychology in the higher institutions of learn-

ing in this country are to-day, on the whole, much better trained in scientific spirit and method, much better acquainted with the technique and the literature of their science, than were the teachers of twenty-five and fifty years ago. For this reason they are more largely the younger men. These facts are on the whole hopeful for the more satisfactory progress in the future of psychology and the allied sciences. But unless at the same time their interest in, and acquaintance with, human life in a large way is correspondingly cultivated, these teachers will not in some respects be the equals, much less the superiors, of the teachers of the olden time. He cannot know, or understand —whether to describe or to explain—what is 'in man,' who has not somehow had it first in his own experience with himself.

It is perhaps partly in reaction against an excessive scholastic spirit and method, that another and quite opposed hindrance to the progress of psychology has recently appeared. I refer now to an absurd surplusage of attempts to render the science popular, which has emanated chiefly from writers who lack almost all the qualifications of the trained expert. It would seem as though the secret meditations of not a few of these popularizers of psychology might be expressed in somewhat the following fashion. "These professors of psychology, these *Fach-Seelenforscher*, are not up to their business; for they are not telling the people much that is new about human nature; and what they do tell is not intelligible to the people, neither is it expressed in an altogether taking way. Go to, now: I will show them how to do it. Since I am a teacher of something, or at least know what plain people want, I will be a teacher of psychology to these same plain people. That is to say, I will write a book which shall have all the science of the professor, and shall also be easily intelligible and practical."

Perhaps such expressions as the foregoing misinterpret the consciousness of this swarm of improvised teachers of psychological science in America to-day. But there is one fact which seems to admit of only one conclusion: the multiplication of books popularizing psychology, written by authors who have never had any truly scientific training, is, on the whole, a distinct hindrance to the best progress of this science. And, in-

deed, what valid reason is there for such an altogether disproportionate affliction of this particular science in this particular way? Books on physics, chemistry, zoölogy, physiology, do not proceed in rival numbers from the pens of men who have never made any prolonged, well concentrated, and judiciously guided study of the subjects treated by these positive sciences. We are inclined to look somewhat too contemptuously upon the 'old psychology' and upon its teachers, because mere schooling as a minister, when made up into a college president, was esteemed a sufficient test of fitness to exploit one's self as an authority in psychological science. But what better is this modern way of gathering from here and from there, concealing in whole or in part the sources from which the information is gathered, emphasizing the didactic calling as practiced from the platform of the school rather than that of the church, and then issuing a patchwork book into the already overcrowded shelves of the publishers?

Fortunately, however, these two opposite tendencies may be expected in time to correct each other; and if those authorities who have scientific preëminence and scholastic opportunity finally get their scientific knowledge popularized, the crude attempt at popularization made by the multitude of tyros may have prepared the way for them. In the meantime, the multitude of books on psychology by those who have really never made any serious, not to say sufficient, study of psychology would seem to be a hindrance to the progress of the science.

Another hindrance to the more rapid advance of psychology is to be found, I think, in the *manner* in which much of the presentation and discussion of psychological problems is conducted. This manner is by no means always or even generally ill-meant: nevertheless, it seems to me inconsistent with the higher and more noble purposes of psychological science. For, in the first place, it excites suspicion, if it does not engender distrust and scorn, on the part of the community looking on from outside the inner circle of psychologists themselves. A dead uniformity of opinion, or an enforced consensus of expression, is, of course, not the genuine scientific attitude toward any subject of investigation; nor does it further the progress of

any science to try to secure prematurely such opinion, such consensus. At the same time, without some common basis of knowledge and of method, it is foolish to speak of the 'science' of psychology at all, and idle to form an association of men who are in the common pursuit of such science. For one, I believe that there already exists a science of psychology. It is not all a 'natural science,' in the sense of being a physiological or cerebral psychology: it is not all an experimental psychology, or a psycho-physical psychology, or a speculative psychology. It is simply the net result of human experience, gathered in whatever way, as to the faithful description and satisfactory explanation of the mental life of the individual man. These net results constitute a very respectable body of established truths; they are the science of psychology. Whoever underestimates and depreciates these commonly accepted truths, and overemphasizes his own peculiar conclusions or methods to the discredit of these truths, is likely to hinder rather than to advance the real interests of psychology. Before the layman he makes the same impression which is made by the new recruit to the missionary force when he proceeds at once to proclaim loudly the differences of his sect or school from all others that bear the common name of Christian.

One cannot for a moment believe that the psychologists of this country are any less under the dominion of authority, or any more exacting in the tests they apply to their hypotheses and theories, than are the physicists, the chemists or the biologists. Yet it is my impression that the latter are, when compared with the former, more respectful toward matured opinions, more appreciative of long-continued services, more accustomed to place the emphasis—where it belongs—upon the growing body of accredited conclusions, and more courteous in the discussion of minor differences. It will be said that if such a difference really exists, it is due to the difference in the character of the subjects studied. For my part, I believe that this, too, is an affair of *personnel* rather than of *matériel*.

In close connection with these differences, one is almost forced to remark another difference that concerns the literary style of that discussion of mooted points in which we psycholo-

gists are apt to indulge. Am I wrong in believing that there is a higher average of dignity and reserve in the polemics of our colleagues of the physico-chemical and biological sciences? Certainly 'discussion' is indispensable to progress in psychology as in all the other positive forms of science; and the place given to it in the journalism or in the associations of psychologists is not too large. Even lively polemics over scientific subjects is not always undesirable: although it is probable that a careful examination of the history of the development of the positive sciences would show that polemics really counts for comparatively little as a contribution to such development. Most of the work which really advances science is done by those who are most diligent in research, patient in forming their own conclusions, and least eager to play the part of the brilliant and destructive critic of other men's conclusions.

But one fails to see—at least in the first instance—why the jaunty, snappy, newspaper style should be more appropriate to the science of psychology than to any of the other natural sciences. Is the soul of man itself such an inferior kind of reality that the discussion of its attributes, activities and development, should run the risks of the other worst improprieties, in order to escape the charge of dullness? Is not levity as inappropriate to the scientific examination and exhibition of the facts of human consciousness, as it is to the description and explanation of the behavior of an amœba or of the development of the egg from a common barn-fowl? Or, again, why should voluminous and prolonged descriptions of a certain species of micro-organisms be welcomed as worth years of scientific research, and then similar studies of mental development be subjected to jest or to fault-finding for the same qualities of thoroughness—and this by psychologists themselves?

On approaching the next, and fourth, kind of hindrances to the best progress of psychological science in America, so far as these hindrances are under the immediate control of psychologists themselves, I am well aware of treading on yet more doubtful and dangerous ground. I must again, however, ask a brief indulgence for the expression of somewhat vague beliefs and fears rather than conclusions based on indisputable facts.

These beliefs and fears it is which lead me to say that the growth of the *commercial spirit* within academical circles, and as touching scholastic affairs, is becoming a real hindrance to psychological science. Now the spirit of genuine science is sincere and unselfish. The man who adopts as his profession any form of science—to use a familiar expression—chiefly 'for what he can make out of it' is really not *in*, or inside of, that science at all. But the mind that follows the science of man's mental life, through feelings of personal ambition, or under the influence of jealousy, prejudice or bigotry—either theological or anti-theological—makes itself thereby less capable of discerning and appreciating its full content, functioning and development.

That the 'commercial spirit' is, the world over, just now increasingly dominant in social and political institutions and relations, admits of no doubt. Hitherto the higher educational circles and institutions of this country have had a large and fortunate exemption from the influences of this spirit. They are still in the enjoyment of a relative exemption from these influences. The teachers of the sciences are still, I believe, less dominated by merely personal considerations in the pursuit of their ideals—the ideals of knowledge as related to the increase of human well-being—than are any other class of men in the country, clergymen not excepted. But there are signs that the commercial spirit is to a certain extent displacing the truly scientific spirit, even in these higher scholastic circles.

I find these signs of the intrusion of the commercial spirit upon the domains of science in the following results: To this spirit it is due, in part, that there is an increasing amount of premature publication on the subject of psychology. I am not one of those who believe that the student should withhold his conclusions until he has made them absolutely unassailable in respect of proof, and perfect in form. If this were the rule, no wise man would ever publish anything. It is quite legitimate, moreover, to subject one's own work, while immature—and even on account of its confessed immaturity—to the criticism of one's colleagues. For the metabolism of every body of a positive science consists in the appropriation of only a part of what

is offered to it, and in the rejection of the remainder. But when premature publication is largely encouraged by the ambition to get one's self into notice, or to better one's financial condition, rather than to advance the cause of science, its excess may become a positive hindrance to science.

In part, also, to the growth of the commercial spirit is due the practice of saying really commonplace things in strange and unfamiliar ways; as though, indeed, mannerism in expression, or license in the invention of new terms, would be mistaken for originality in research and for independence of thinking. Doubtless, psychology has the same right as any other science to develop a technical terminology. And if a new mental factor, or faculty, or law of mental life, is discovered by any student of psychology, and no appropriate term for the discovery seems to be at hand, why—I, for one, am not going to say that the discoverer is not entitled to signalize the triumph of his insight by giving a new name to his discovery. At the same time, the science of psychology may well be very conservative in such matters. A time-honored truth is no better, a time-worn fallacy is no more acceptable, because either is presented in language calculated to deceive the laity into thinking that it is the latest thing in modern psychology. Genuine science will not increase its speed by exacerbating our characteristic American impatience. After all, even modern science goes pretty slow; not a few of its most loudly applauded recent results will probably have to be carefully reconsidered and much modified before they are adopted into the body of its assured results.

Hitherto the pursuit of the positive sciences in this country has been remarkably free, as compared with European countries generally, from hindrances growing out of personal and institutional jealousies. This freedom has been partly due to difference in the mode of making academic appointments, and in the relations of supply and demand as touching the candidates for these appointments. There are some signs that the growth of the commercial as distinguished from the genuine scientific spirit is beginning to breed and to foster personal and institutional jealousies among us. If these signs tell the truth, then the truth is to be deplored. But surely the remedy for this hin-

drance to the more rapid progress of psychology, if it exist, is an affair of *personnel* rather than of *matériel*.

There is one other hindrance to psychology, as a claimant to some established position among the positive sciences, which I wish to note. This is a certain vacillating and insecure attitude toward the other most closely allied sciences—an attitude somewhat similar to that of the *nouveaux riches* toward the recognized aristocratic classes of society. I firmly believe that psychology, in respect both of subject-matter and of method, and also of available accumulations, might make itself entitled to take a place of equality—equally independent and free-spirited, equally docile and temperate—among the modern sciences. The physico-chemical and biological sciences all have much wealth of knowledge and of technique to share with psychology; I believe that psychology might have something approaching an equal value to share with them. And the recent 'affiliation' to which every meeting of this Association bears witness is one of the best signs of the 'better-time-coming' for psychological science.

The older psychology was too much disposed to maintain an attitude of exaggerated independence, of stiff and proud aloofness, toward physics, chemistry and the biological sciences. Its teachers knew that their souls were their own; and they often appeared to suppose that the scientific study of these souls could be best conducted in complete disregard of the physical conditions and environment in which all mental life and mental development is set. The new psychology, in its proper reaction from this attitude of unscientific isolation, is tempted to take an attitude of equally unscientific servility. Its teachers are less sure that their souls are their own, or even that there are any souls, than were the teachers of the earlier days. Some of them are less sure than is the average chemist, physicist or biologist, who—however modern he may be in his own specialty—is rather apt to be conservative with regard to the existence of his own soul.

In the history of scientific development always, but perhaps never more than of late, there has existed in the minds of some —enthusiastic dreamers, for the most part, albeit often men of

great eminence in the particular sciences—the captivating notion of a '*universal*' science. If we could only get at this one science, in all its depth and height and length, then we should have at least the key to all the mysteries of universal Nature. She would, to be sure, still remain rather a complicated and somewhat freakish and irregular creature; but man would have the science of her, in the large, as it were. Of late, the last-century conception of the universal mechanism, under which all selves and all things alike come, has been somewhat thoroughly shaken up. But the demand, or the hortation, for another step toward the ideal of unity, is generally issued at present by some one of the particular sciences to those others which lie nearest its own door. For example, physics may be willing to unify chemistry—by absorbing it into itself. Chemistry may wish to effect a complete harmony with physiology, in somewhat the same way. Undoubtedly, in the minds of a multitude of biologists, psychology, as a science, is only a subdivision of biology, a dependent branch on the tree of universal life. All this reminds one of the current practical proposals to effect a unity of the Church, which, in the thought of each particular denomination, take the form of an 'embracement' of all the other denominations, by that particular one making itself the universal.

On the other hand, I wish to testify out of my personal experience that I have found more of the truly scientific reserve and caution, in the matter of premature and unverified extension of their own principles, on the part of the most thoroughly cultivated men in the physico-chemical and biological sciences, than on the part of a large number of psychologists when dealing with these same physical and biological principles. Suppose, for example, the question arises as to the bearing of the theory of the conservation and correlation of energy upon the psychological problem of the will; or that the accepted principles of cerebral physiology—granted the very doubtful claim that such principles can be found—be asked to contribute to the discussion of the hypothesis of psycho-physical parallelism; or what not among hypotheses of this order. It is my experience that the psychologist who has only a smattering of knowledge on these

physico-chemical subjects is much the likelier to take the unscientific and prematurely 'cocksure' position, with regard to their application to psychological subjects—in the name of the borrowed, but misunderstood and misapplied, authority of the chemico-physical and biological sciences.

But however this may be, there is little doubt that any other than an independent attitude, which is also respectful and docile, toward allied sciences is distinctly disadvantageous to the science of psychology. There is just as little doubt that the vacillating and uncertain or servile attitude toward certain other sciences, which not a few students of psychology assume, is a convincing witness to a raw and immature and misinformed condition of mind respecting their own science. Psychology, if it wishes to get more respect from the other members of the great brotherhood of science, must respect itself. In order to entitle itself to more self-respect and to more of respect from others, it must be, of course, respectful and teachable toward all truth; but it must also know its own peculiar rights of domain, must maintain and defend them, and must cultivate this domain by its own somewhat peculiar methods, with the free and independent spirit which belongs to every worker in every field of science. Psychology must remain 'affiliated;' it must enter more intimately into the circle of affiliated science; but it must go there more and more richly laden, to teach and to learn, as 'one among many' who are really all working toward the same end. That end is the scientific conquest of all reality, to the improvement of human society.

Well, brethren of the Association of Psychologists in America, I have expressed somewhat freely my private opinions. They are *mere* opinions; and you will, of course, take them only for what they may seem to you worth. There is, of course, another and brighter side; abundant helps and signs of progress, as well as certain hindrances and indications of an unsatisfactory rate of progress. It is of the latter, so far as they belong more to *personnel* than to *matériel*, that I have ventured to speak. And the practical lesson, if there be any, is obvious.

THE EVOLUTION OF MODESTY.

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Modesty—which may be provisionally defined as an almost instinctive fear, prompting to concealment, and usually centering around the sexual nature—while common to both sexes is more especially feminine, so that it may almost be regarded as the chief secondary sexual character of women on the psychic side. The woman who is lacking in this kind of fear is lacking also in sexual attractiveness to the normal and average man. As a psychic secondary sexual character of the first rank, is it necessary, before any psychology of sex can be arranged in order, to obtain a clear view of modesty.[1]

I have not, however, been able to find that the subject of modesty has been treated in any comprehensive way by psychologists. Though valuable facts and suggestions bearing on sexual emotions, on disgust, on the origin of tattooing, on ornament and clothing, have been brought forward by physiologists, psychologists and ethnographists, few or no attempts appear to have been made to reach the general synthetic statement of these facts and suggestions.[2] The subject is indeed complicated by

[1] I may remark that the present paper is an abstract of a study to be published in the second volume of my *Studies in the Psychology of Sex*.

[2] It is true that many unreliable, slight or fragmentary attempts have been made to ascertain the constitution or basis of this emotion. Herbert Spencer, followed by Sergi and others, regarded modesty simply as the result of clothing. This view is overturned by the well ascertained fact that many races which go absolutely naked possess a highly developed sense of modesty. These writers have not realized that psychological modesty is earlier in appearance, and more fundamental, than anatomical modesty. A partial contribution to the analysis of modesty has been made by Professor James, who with his usual insight and lucidity has set forth certain of its characteristics, especially the element due to 'the application to ourselves of judgments primarily passed upon our mates.' Westermarck, again, followed by Grosse, has very ably and convincingly set forth certain factors in the origin of ornament and clothing, a subject which

the difficulty of excluding closely allied emotions,—shame, shyness, bashfulness, timidity, etc.—all of which, indeed, however defined, adjoin and overlap modesty.[1] It is not, however, impossible to isolate the main body of the emotion of modesty, on account of its special connection, on the whole, with the consciousness of sex. I here attempt, however imperfectly, to reach my own analysis of its constitution and development.

That modesty is based on fear, one of the most primitive of the emotions, seems to be fairly evident. It is, indeed, an agglomeration of fears, especially, as I hope to show, of two important and distinct fears, one of much earlier than human origin and supplied solely by the female, the other of more distinctly human character and of social rather than sexual origin.

A child left to itself, though very bashful, is wholly devoid of modesty. Every one is familiar with the shocking *inconvenances* of children in speech and act, with the charming ways in which they innocently disregard the conventions of modesty their elders thrust upon them, or, even when anxious to carry them out, wholly miss the point at issue.

Under civilized conditions, moreover, the convention of modesty long precedes its real development. It may fairly be said that this takes place at the advent of puberty. We should not, however, be justified in asserting that on this account modesty is a purely sexual phenomenon. The social impulses also develop about this time, and to that coincidence the com-

many writers imagine to cover the whole field of modesty. More recently, Ribot, in his work on the emotions, has vaguely outlined most of the factors of modesty, but has not developed a coherent view of their origins and relationships.

[1] Timidity, as understood by Dugas in his interesting essay on that subject, is probably most remote. Dr. H. Campbell's 'Morbid Shyness' (*British Medical Journal*, 26 September, 1896) is in part identical with timidity, in part with modesty. The matter is further complicated by the fact that 'modesty' itself has in English (like virtue) two distinct meanings. In its original form it has no special connection with sex or with woman, but may rather be considered as a masculine virtue. Cicero regards 'modestia' as the equivalent of the Greek σωφροσύνη. This is the 'modesty' which Mary Wollstonecraft eulogized in the last century, the outcome of knowledge and reflection, 'soberness of mind,' 'the graceful calm virtue of maturity.' In French it is possible to avoid this confusion, and 'modestie' is entirely distinct from 'pudeur.' It is of course with 'pudeur' that I am here concerned.

pound nature of the emotion of modesty may well be largely due.

The sexual factor is, however, the simplest and most primitive element of modesty, and may, therefore, be mentioned first.

This fundamental animal factor of modesty,[1] rooted in the natural facts of the sexual life of the higher mammals, and especially man, obviously will not explain the whole phenomena of modesty; it fails to account for ornaments and garments, and it scarcely appears to present an adequate basis for modesty in the male. For this we must, in large part at least, turn to the other great primary element of modesty, the social factor.

We cannot doubt that one of the most primitive and universal of the social characteristics of man is an aptitude for disgust, founded as it is on a yet more primitive and animal aptitude for disgust which has little or no social significance. In nearly all races, even the most savage, we seem to find distinct traces of this aptitude for disgust in the presence of certain actions of others, an emotion naturally reflected in the individual's own actions, and hence a guide to conduct. Notwithstanding our gastric community of disgust with lower animals, it is only in man that this disgust seems to become highly developed, to possess a distinctly social character, and to serve as a guide to social conduct. The objects of disgust vary infinitely according to the circumstances and habits of particular races, but the reaction of disgust is fundamental throughout.

The best study of the phenomena of disgust known to me is without doubt Professor Richet's.[2] Richet concludes that it is the *dangerous* and the *useless* which evoke disgust. Certain excretions and secretions, being either useless or, in accordance with wide-spread primitive ideas, highly dangerous, the sacro-pubic region became a concentrated focus of disgust. It is for this reason, no doubt, that savage men exhibit modesty, not only towards women, but towards their own sex, and that so many of

[1] For the detailed treatment of which the forthcoming work may be consulted.

[2] C. Richet, 'Les causes du dégout,' *L'homme et l'intelligence*, 1884. This eminent physiologist's elaborate study of disgust was not written as a contribution to the psychology of modesty, but it forms an admirable introduction to the investigation of the social factor of modesty.

the lowest savages take precautions to obtain seclusion for the fulfilment of natural functions. The statement now so often made that the primary object of clothing is to accentuate rather than to conceal has in it—as I shall point out later—a large element of truth, but it is by no means a complete account of the matter. It seems very difficult not to admit that there is a genuine impulse to concealment among the most primitive peoples, and the invincible repugnance often felt by savages to remove the girdle or apron is scarcely accounted for by the theory that it is a sexual lure.

In this connection it seems to me instructive to consider a special form of modesty very strongly marked among savages in some parts of the world. I refer to the feeling of immodesty in eating. When this feeling exists, modesty is offended when one eats in public; the modest man retires to eat. Indecency, said Cook, was utterly unknown among the Tahitians; but they would not eat together; even brothers and sisters had their separate baskets of provisions, and generally sat some yards apart, with their backs to each other, when they ate.[1] Karl von den Steinen remarks, in his interesting book on Brazil, that, though the Bakairi of Central Brazil have no feeling of shame about nakedness, they are ashamed to eat in public: they retired to eat, and hung their heads in shamefaced confusion when they saw him innocently eat in public. Hrolf Vaughan Stevens found that, when he gave an Orang Lâut (Malay) woman anything to eat, she not only would not eat if her husband were present, but if any man were present she would go aside before eating or giving her children to eat.[2]

It is quite easy to understand how this arises. Whenever there is any pressure on the means of subsistence, as among

[1] Crawley (*Jour. Anthropological Inst.*, May, 1895) gives numerous similar instances, even in Europe, with, however, special reference to sexual taboo. I may remark that English people of lower classes, especially women, are often modest about eating in the presence of people of higher class. This feeling is no doubt due in part to the consciousness of defective etiquette, but that very consciousness is a development of the fear of causing disgust which is a component of modesty.

[2] Stevens, 'Mittheilungen aus dem Frauenleben der Orang Belendas,' *Zt. für Ethnologie*, 1896, Heft IV., p. 167.

savages at some time or another there nearly always is, it must necessarily arouse a profound emotion of anger and disgust to see another person putting into his stomach what one might as well have put into one's own. The special secrecy sometimes observed by women is probably due to the fact that women would be more sensitive to the emotion of disgust that the act of eating arouses in onlookers. As social feeling develops a man desires not only to eat in safety, but also to avoid being an object of disgust, and to spare his friends all unpleasant emotions. Hence it becomes a requirement of ordinary decency to eat in private. A man who eats in public becomes—like the man who in our cities exposes his person in public—the object of disgust and contempt.

Long ago, when a hospital student on midwifery duty in London slums, I had occasion to observe that among the women of the poor, and more especially in those who had lost the first bloom of youth, modesty consisted chiefly in the fear of being disgusting. There was almost a pathetic anxiety, in the face of pain and discomfort, not to be disgusting in the doctor's eyes. This anxiety expressed itself in the ordinary symptoms of modesty. But as soon as the woman realized that I found nothing disgusting in whatever was proper and necessary to be done under the circumstances, it almost invariably happened that every sign of modesty at once disappeared. In the special and elementary conditions of parturition, modesty is reduced to this one fear of causing disgust, so that when that is negatived, the emotion is non-existent and the subject becomes, without an effort, as direct and natural as a little child. A fellow-student on similar duty, who also discovered for himself the same character of modesty, remarked on it to me with some sadness; it seemed to him derogatory to womanhood that what he had been accustomed to consider its supreme grace should be so superficial that he could at will set limits to it. I thought then, as I think still, that that was rather a perversion of the matter, and that nothing becomes degrading because we happen to have learnt something about its operations. But I am more convinced than ever that the fear of causing disgust—a fear quite distinct from that of losing sexual lure or breaking a rule of social etiquette—plays

a very large part in the modesty of the more modest sex and in modesty generally. Whatever magnifies self-confidence and lulls the fear of evoking disgust—whether it is the presence of a beloved person in whose good opinion complete confidence is felt, or whether it is merely the grosser narcotizing influence of a slight degree of intoxication—always automatically lulls the emotion of modesty. Together with the sexual factor, the social fear of evoking disgust seems to me the most fundamental element in modesty.

It is on this animal basis that the human and social fear of arousing disgust has developed. Among civilized people, it may be added, the fear of arousing disgust is the ultimate and most fundamental element of modesty.

Another factor of modesty, which reaches a high development even in savagery, and among more or less naked races, is the idea of ceremonial uncleanness. It may be to some extent rooted in the elements already referred to, and it leads us into a much wider field than that of modesty, so that it is only necessary to mention it here. Ritual tends to crystallize around any act of life on which men expend deliberate attention, and the duties of modesty among savages are a sufficiently serious part of life to constitute a nucleus for ritual. No doubt offences against ritual may be regarded as more serious than offences against modesty, but they are so obviously allied in early culture that the one reinforces the other, and they cannot be easily disentangled. All savage and barbarous people who have attained any high degree of ceremonialism have included certain animal functions more or less stringently within the bonds of that ceremonialism. It is only necessary to refer to the Jewish ritual books of the Old Testament, to Hesiod, or to the customs prevalent among Mohammedan peoples.

So far it has only been necessary to refer incidentally to the connection of modesty with clothing. I have sought to emphasize the unquestionable but often forgotten fact that modesty is in its origin independent of clothing, that physiological modesty takes precedence of anatomical modesty, and that the primary factors of modesty were developed long before the discovery of either ornament or garments. The rise of clothing probably

had its first psychic basis on an emotion of modesty already compositely formed of the elements we have traced. Both the main elementary factors, it must be noted, must naturally tend to develop and unite in a more complex, though, it may well be, much less intense emotion. A very notable advance, I may remark, is made when the primary attitude of defence against the action of the male becomes merely a defence against his eyes. We may thus explain the spread of modesty to various parts of the body. We see the influence of this defence against strange eyes in the special precautions in gesture or clothing taken by the women in various parts of the world against the more offensive eyes of civilized Europeans.

But in thus becoming directed merely against sight and not against action, the gestures of modesty are at once free to become merely those of *coquetterie*. When there is no real danger of offensive action, there is no need for more than playful defence, and no serious anxiety should that defence be taken as a further invitation. Thus the road is at once fully open towards the most civilized manifestation of the comedy of courtship.

In the same way the social fear of arousing disgust combines easily and perfectly with any new development in the invention of ornament or clothing as sexual lures. Even among the most civilized races it has often been noted that the fashion of feminine garments (as also sometimes the use of scents) has the double object of concealing and attracting. The heightening of attraction is indeed a logical outcome of the fear of evoking disgust.

The contention of Westermarck, that ornament and clothing are in large part due to the desire to give not concealment but greater prominence, may certainly be accepted, so long as we realize that it is not the whole of the truth, and that it is far from offering a complete explanation of the phenomena of modesty. The great artistic elaboration often displayed by such articles of ornament and clothing, even when very small, and the fact—as shown by Karl van den Steinen regarding the Brazilian *uluri*—that they may serve as common elements in general decoration, sufficiently prove that such objects attract rather than escape attention. And while there is an invincible

repugnance among some peoples to remove these articles, such repugnance being often strongest when the adornment is most minute, others have no such repugnance, or are quite indifferent whether or not their aprons are accurately adjusted. The mere presence or possession of the articles gives the required sense of self-respect, of human dignity, of sexual desirability. But, on the whole, all the motives already noted combine to concentrate modesty on the garment.

When clothing is once established, another element, this time a social-economic element, often comes in to emphasize its importance and increase the anatomical modesty of women. I mean the growth of the conception of women as property. Waitz, followed by Schurtz and Letourneau, has insisted that the jealousy of husbands is the primary origin of clothing and, indirectly, of modesty. It is undoubtedly true that married women are often only or chiefly clothed, while the unmarried women, though full-grown, are not. In many parts of the world, also, Mantegazza and others have shown, where the women are covered and the men are not, clothing is regarded as a sort of disgrace, and men can only with difficulty be persuaded to adopt it. Before marriage a woman was often free and not bound to chastity, and at the same time was often unclothed; after marriage she was clothed and no longer free. To the husband's mind, the garment appears—illogically though naturally—a moral and physical protection against any attack on his property. Thus a new motive was furnished, this time somewhat artificially, for making nakedness, in women at all events, disgraceful. As the conception of property also extended to the father's right over his daughters, and the appreciation of female chastity developed, this motive spread to unmarried and married women alike. It probably constitutes the chief element furnished to the complex emotion of modesty by the barbarous stages of human civilization.

The chief new feature—it is scarcely an original element—added to modesty when an advanced civilization slowly emerges from barbarism is the elaboration of its social ritual. Civilization expands the range of modesty and renders it more capricious and changeable. The French seventeenth century and

the English eighteenth represent early stages of modern European civilization, and they both devoted special attention to the elaboration of the minute details of modesty. The frequenters of the Hôtel Rambouillet, the *précieuses* satirized by Molière, were primarily engaged in refining the language, but indirectly also in refining feelings and ideas and in enlarging the boundaries of modesty. In England such famous and popular authors as Swift and Sterne bear witness to a new ardor of modesty in the sudden reticences, the dashes and the asterisks, which we find throughout their works. The altogether new quality of literary prurience of which Sterne is still the classic example could only have arisen on the basis of the new modesty which was then overspreading society and literature. Idle people, mostly the women in *salons* and drawing-rooms, people more familiar with books than with the realities of life, now laid down the rules of modesty, and were ever enlarging it, ever inventing new subtleties of gesture and speech, which it would be immodest to neglect, and which were ever being rendered vulgar by use and ever changing.

It would, however, be a mistake to suppose that this process is an intensification of modesty. It is, on the contrary, an attenuation of it. The observances of modesty become merely a part of a vast body of rules of social etiquette, though a somewhat stringent department of these rules on account of the vague sense still persisting of a deep-lying natural basis. The whole emotion has been, in a certain sense, undermined, and yields more readily than in its primitive state to any invasion supported by a sufficiently strong motive. The savage Indian woman of America, the barbarous woman of some Mohammedan countries, can scarcely sacrifice their modesty even in the pangs of childbirth. Fashion, again, in the more civilized countries can easily inhibit anatomical modesty, and rapidly exhibit in turn almost any portion of the body. In savage and barbarous countries modesty often possesses the strength of a genuine and irresistible instinct. In civilized countries any one who places considerations of modesty before the claims of some real human need excites ridicule and contempt.

It is, however, impossible to contemplate this series of phe-

nomena, so radically persistent, whatever its changes of form, and so constant throughout every stage of civilization, without feeling that, although modesty cannot properly be called an instinct, there must be some physiological basis to support it. Undoubtedly such a basis is formed by that vasomotor mechanism of which the most obvious outward sign is in human beings the blush.[1] All the allied emotional forms of fear—shame, bashfulness, timidity—are to some extent upheld by this mechanism, but this is especially the case with the emotion we are now concerned with. The blush is the sanction of modesty.

When the Brazilian offered Karl van den Steinen some food which he ate immediately in public, the Brazilian hung his head. Whether or not he blushed, he was certainly conscious of that capillary turmoil of the face, of which the shock of offended modesty is the cause and blushing the most visible sign. It is scarcely an accident that, as has been often observed, criminals or the anti-social element of the community—whether by the habits of their lives or by congenital abnormality—blush less easily than normal persons.[2] The importance of the blush and the emotional confusion behind it as the sources of modesty is shown by the significant fact that by skillfully lulling emotional confusion it is possible to inhibit the sense of modesty itself. In other words, it may be said that we are here in the presence of a fear—to a large extent a sex-fear—impelling to concealment, and the emotion naturally disappears, even though its ostensible

[1] The blush is indeed only a part, almost perhaps an accidental part, of an organic turmoil with which it is associated. Partridge, who has studied the phenomena of blushing in 120 cases (*Pedagogical Seminary*, April, 1897), finds that the following are the chief symptoms: tremors near the waist or passing from the feet to the head, weakness in the limbs, pressure, trembling, warmth, weight, a beating in chest, warm wave from feet upwards, quivering of heart, stoppage and rapid beating of heart, coldness all over followed by heat, dizziness, tingling of toes and fingers, numbness, something rising in throat, smarting of eyes, ringing of ears, prickling sensation of face, pressure inside head.

[2] Kroner (*Das körperliche Gefühl*, 1887, p. 130) remarks: "The origin of a specific connection between shame and blushing is the work of a *social selection*. It is certainly an immediate advantage for a man not to blush; indirectly, however, it is a disadvantage, because in other ways he will be known as shameless, and on that account, as a rule, he will be discriminated against in marriage. This social selection will be especially exercised on the female sex, and on this account women blush to a greater extent and more readily than men."

cause remains, when it is apparent that there is no cause for fear. Thus it is, to some extent at least, true that people are modest because they blush, or because they feel the possibility of blushing, rather than that they blush because they are modest. In the same way we may explain the curious influence of darkness in restraining the manifestations of modesty.[1] This mechanism of blushing thus runs parallel, on the physiological side, with that fear of evoking disgust to which I have already referred. It is to the blush also that we must attribute a curious complementary relationship between the face and the sacro-pubic region as centers of anatomical modesty. The women of some African tribes who go naked, Ploss remarks, cover the face with the hand under the influence of modesty. When, as among many Mohammedan peoples, the face is the chief focus of modesty, the exposure of the rest of the body, including even the sacro-pubic region, becomes a matter of comparative indifference. All such facts serve to show that, though the forms of modesty may change, it is yet a very radical constituent of human nature in all stages of civilization, and that it is to a large extent maintained by the mechanism of blushing.

It may still be asked, finally, whether on the whole modesty really becomes a more predominant emotion as civilization advances. I do not think this position can be maintained. It is a great mistake, as we have seen, to suppose that in becoming extended modesty also becomes intensified. On the contrary, this very extension is a sign of weakness. Among savages modesty is far more radical and invincible than among the civilized. Of the Araucanian women of Chili Treutler has remarked that they are distinctly more modest than the Christian white population, and such observations might be indefinitely extended. It is, as we have already noted, in a new and crude civilization, anxious to mark its separation from a barbarism it has yet scarcely escaped, that we find an extravagant and fantastic anxiety to extend the limits of modesty in life and art and literature. In older and more mature civilizations—in classic

[1] The influence of darkness in inhibiting modesty is a very ancient observation. Burton in the *Anatomy of Melancholy* quotes Dandinus: 'Nox facit impudentes,' rightly connecting the influence with blushing.

antiquity, in old Japan, in France—modesty, while still a very real influence, becomes a much less predominant and all-pervading influence. In life it becomes subservient to human use, in art to beauty, in literature to expression. Among ourselves we may note that modesty is a much more invincible motive among the lower social classes than among the more cultivated classes. Modesty is a part of self-respect, but in the fully developed human being self-respect itself holds in check any excessive modesty. We must remember, moreover, that there are more definite grounds for the subordination of modesty with the development of civilization. We have seen that the factors of modesty are many, and that most of them are based on emotions which make little urgent appeal save to races in a savage or barbarous condition. Thus disgust, as Richet has truly pointed out, necessarily decreases as knowledge increases.[1] As we analyze and understand our experiences better, so they cause us less disgust. As disgust becomes analyzed, and as self-respect tends to increased physical purity, so the factor of disgust in modesty is minimized. The factor of ceremonial uncleanness, again, which plays so urgent a part in modesty at certain stages of culture, is to-day without influence, except in so far as it survives in etiquette. In the same way the social-economic factor of modesty belongs to a stage of human development which is wholly alien to an advanced civilization. Even the most fundamental impulse of all, the gesture of sexual refusal, is normally only imperative among animals and savages. Thus civilization tends to subordinate if not to minimize modesty, to render it a grace of life rather than a fundamental social law of life. But an essential grace of life it still remains, and whatever delicate variations it may assume we can scarcely conceive of its disappearance.

[1] Disgust is a sort of synthesis which attaches to the total form of objects, and which must diminish and disappear as scientific analysis separates into parts what as a whole is so repugnant.

PROCEEDINGS OF THE SEVENTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, COLUMBIA UNIVERSITY, NEW YORK, DECEMBER, 1898.

Report of the Secretary for 1898.

The seventh annual meeting of the American Psychological Association was held at Columbia University, New York, December 28, 29 and 30, 1898, the same time and place having been chosen by the American Society of Naturalists and the Affiliated Societies.

In point of numbers the meeting was the most successful in the history of the Association, there being fifty-one members in attendance at the various sessions. On the morning of Thursday, a joint meeting with the American Physiological Society was held, members of both societies contributing papers, and, by invitation, Professor Ogden N. Rood, of the Department of Physics of Columbia University, read a paper on, and exhibited his Flicker Photometer. On Thursday afternoon the Association adjourned for the discussion before the Naturalists on 'Advances in Methods of Teaching,' Professor Münsterberg representing the Psychologists.

The members of the Association, for the most part, attended the addresses by Mr. Morris K. Jesup and Professor Henry F. Osborn, at the American Museum of Natural History, on Wednesday evening, and later the reception to the visiting societies, given by Professor and Mrs. Osborn, at their residence. About thirty members were present at the annual dinner of the Affiliated Societies, held at the Hotel Savoy, on Thursday evening. President Hugo Münsterberg presided at the meetings of the Association.

At the business meeting of the Association on Friday morning, the following was transacted: Election of officers for 1899:

President, Professor John Dewey, University of Chicago; *Secretary and Treasurer*, Dr. Livingston Farrand, Columbia University; *Members of the Council*, Professor J. McKeen Cattell, Columbia University, and Professor H. N. Gardiner, Smith College.

The following new members were elected: Dr. Raymond Dodge, Wesleyan University; Dr. Eleanor A. McC. Gamble, Wellesley College; Dr. Gervase Green, Yale University; Dr. A. L. Jones, Columbia University; Mr. James H. Leuba, Bryn Mawr College; Professor Ernest H. Lindley, University of Indiana; Dr. Walter T. Marvin, Columbia University; Mr. Will S. Monroe, State Normal School, Westfield, Mass.; Miss Ethel D. Puffer, Radcliffe College; Professor George Santayana, Harvard University; Professor Langdon C. Stewardson, Lehigh University; Dr. Edward L. Thorndike, Western Reserve University; Dr. Gustavo Tosti, New York City.

The following amendment to the constitution proposed at the meeting in Ithaca, in 1897, was taken up and passed, viz.: That the Secretary be elected for a term of three years and be *ex-officio* a member of the Council.

On motion of Professor Baldwin, a Standing Committee on Psychological and Philosophical Terminology was appointed, consisting of the following members: Professors Münsterberg, Cattell, Sanford, Creighton, Royce, Minot and Baldwin. The duties of this Committee shall be: (1) To recommend, from time to time, new terms in Psychology and Philosophy. (2) To recommend choice of alternative terms in those fields. (3) To recommend foreign equivalents for translating work both into English and into foreign languages. (4) To keep the Association informed as to the growth of terminology in other departments, especially in Neurology. The Committee shall have power to get help from foreigners who are not members of the Association, such individuals to be known as 'Associates' of the Committee.

On motion of Professor Sanford, it was

Resolved: First, that the matter of the organization of the Association with reference to a possible philosophical section be referred to the Council, to be reported upon at the next meeting;

Second, that the Secretary be instructed in arranging the programme for the next meeting to gather philosophical papers as far as practicable into the programme of one session; *Third*, that the Secretary be instructed to send out during the course of the year a circular letter requesting, for the information of the Council, the opinion of the individual members of the Association on the above mentioned question of the organization of the Association.

Professor Cattell, Chairman of the Committee on Physical and Mental Tests, presented the report of that Committee upon its work during the past year.

REPORT OF THE TREASURER FOR 1898.

Livingston Farrand in account with The American Psychological Association.

DR.

To balance at last meeting		$669 10
Dues of members		249 00
Sale of Proceedings		25
		$918 35

CR.

By expenditures for		
Postage, telegrams, etc	$11 20	
Stationery	5 70	
Printing, clerical work, etc	22 57	
Expenses of meeting of Affiliated Societies	3 00	
Committee on Physical and Mental Tests	75 00	
		117 47
Balance on hand		$800 88

Audited by the Council and found correct.

LIVINGSTON FARRAND,
Secretary and Treasurer.

ABSTRACTS OF PAPERS.

Address of the President: *Psychology and History*. By HUGO MÜNSTERBERG.

The psychological view of human life and the really historical view are necessarily in conflict; for the one the personality is a complex of elements and causally determined, for the other it is

a unity and free. The naturalistic tendencies of the last half century have favored the analytic and explanatory treatment, but our time shows a new revival of historical thinking. In this conflict the belief in the rights and duties of the personality must destroy psychology if it cannot be shown that both are partial truths, and thus no conflict between them necessary, since the one does not exclude the other. Recent writers have claimed, indeed, that psychology and history are two coördinated ways of dealing with the reality of life in so far as psychology seeks laws and tries thus to explain, while history deals merely with the single facts as such. These arguments are untenable: first, because every law implies also existential propositions and offers thus descriptions together with the explanations; secondly, because every description of single facts includes the laws, since the conceptions by which we describe are the condensed results of explanations; thirdly, because the single object as such, really isolated, is not object of any science but always object of art. Every science connects the facts, and, therefore, the historical sciences too must deal with general facts. There is thus no methodological difference between history and psychology. And yet a most important difference between the two does exist: it is an ontological difference. Both connect their material by general facts, but the material of psychology consists of objects which as such can be described and explained, while the material of history consists of subjective will acts which as such can merely be interpreted and appreciated. Our interest in objects means merely our expectation as to what we have to await from them; if we consider mental life as object, we transform it in the interest of causal connection and seek causal laws. The subjective will acts on the other hand interest us in the first instance with regard to their meaning; we want to understand with what other subjective acts they agree and disagree, and we come thus to a teleological system in which every will act is linked with every other will act as every molecule in the causal world is dependent upon the whole universe. In such a teleological system the general fact is then not a causal law but a will relation of inclusive character. As every willing personality can be thought of as replaced by the psychophysical organ-

ism, that is by an object, therefore every human experience can be brought into the causal and into the teleological system. As long as they are not mixed each is true, but each is a transformation of reality and not reality itself.

Discussion on the Relations of Will to Belief. PROFESSOR JAMES and DR. MILLER, who were to have taken part in the debate, being prevented from attending, the discussion was carried on by PROFESSORS LADD, HIBBEN, CALDWELL and ARMSTRONG, as follows:

By JOHN GRIER HIBBEN.

It will doubtless be conceded, by all who take part in this discussion, that the will does either directly or indirectly factor in those complex mental processes which lead to belief. A question which naturally suggests itself from the standpoint of logic is whether the presence of will in belief is a reflection upon man's reasoning powers. Should all conclusions be reached in the 'dry light of reason,' and when this is impossible should we withhold judgment altogether? This is an ideal which, in certain situations, it is impossible to realize, for we must distinguish between the area of exact knowledge and that larger sphere of our experience which lies beyond this area of light. In the former sphere our beliefs form a series of judgments grounded upon knowledge, elements which comprise a system of inter-related, coördinated parts. Here belief arises from evidence mediated by experiment, and admitting of exact verification. In such a sphere to allow the 'passional nature' to influence our judgments is to prove recreant to our sacred obligation to follow the light of reason alone in the realm of exact knowledge. Lying without this region, however, are spheres in which the will may be consciously operative in the formation of our judgments, without sacrificing the integrity of our nature as rational animals. I would indicate three of these spheres:

1. Where complete evidence is lacking, and yet some action, which in itself is a decision, is imperative. A judge may withhold his decision for fuller evidence, but not so the actor in the struggle of life. He must often make up his mind from an im-

plicit apprehension of the situation viewed as a whole, and which resists all attempts to analyze it further.

2. Where our belief as to the result of our activity is itself a factor in producing that result. This is the sphere in which "hope creates out of its own wreck the thing it contemplates."

3. Where an initial interest in a proposition, or an investigation, is of such a nature as not to prejudge the result, but to stimulate the attention in such a manner that all possible evidence is duly considered. A will to attend is thus related intimately to the resulting belief.

By WILLIAM CALDWELL.

I. The relation of will to belief can be discussed only under the presuppositions of (*a*) the newer psychology of volition, (*b*) the philosophy of volition inaugurated by Schopenhauer, (*c*) the logical doctrine of different 'universes of reality,' in regard to which the expert or 'believer' in question is the first court of appeal, (*d*) the fact that into the formation of belief elements at first non-intellectual undoubtedly enter, (*e*) the fact that theologians as well as psychologists are expounding beliefs from the point of view of *dynamogenesis*.

II. Both will and belief have *retrospective* and *prospective* aspects. (*a*) Retrospectively considered, a man's *will* represents the sum of tendencies to act, that his experience has led him to regard as in conformity with the tendency of things; while a man's *belief* is his active sense of the *realities* with which his experience has brought him into contact. (*b*) Prospectively considered, a man's will or tendency-to-act (like an 'apperceptive system') is always slightly in advance of the matter of his present or formulated knowledge. And as to *belief*, a man has the power of testing by conscious experience the action-value or organization-value (*i. e.*, the value so far as the systematizing and developing of his own nature and tendencies are concerned) of the highest religious or moral practices and ideals of his time. Only, a man's adoption of this 'social' or 'organization' standpoint is far more matter of unconscious and inevitable volition than of conscious and arbitrary volition. We are practically necessitated (and not merely 'free') to believe in that which furthers our development.

III. We are still too close to Cartesianism and Hegelianism and 'faculty-psychology' and 'presentationism' and to external views of the realities of belief, to be able to accept the doctrine that, in the individual and in the race, volition comes first and knowledge and belief afterwards, without feeling that some kind of injustice is done to knowledge. We really *believe* not in things 'beyond' knowledge, but *only* in that which we know—only in those things which we know to constitute the reality and the conditions of our experience.

By A. C. ARMSTRONG, JR.

The historical consideration of this question demands a broad interpretation of it. It concerns belief (*a*) as affected not merely by 'will' in the technical sense but by the whole 'passional' or 'non-intellectual nature'; (*b*) as meaning assent to propositions not demonstrably established. One root of the 'faith-philosophy' is found by Miller (*International Journal of Ethics*, Jan., 1899, p. 169) in the egoistic and adventurous spirit of the Revolution and the romantic movement. A second, more widely spread and more important, source is the tendency shown in periods of *Aufklärung* to appeal from the head to the heart in support of the imperiled foundations of the ideal life. Hence the positions of Pascal and Bayle in the seventeenth century; of Rousseau, Kant, Schleiermacher and others at the end of the eighteenth and the beginning of the nineteenth; of Balfour, Romanes, James, of the neo-Kantian and Ritschlian philosophers of religion in the present age. But there is a counter-argument, also historical and recurrent, in behalf of pure reason: that the faith-philosophy is obscurantism and unreason, even that it is dishonest and unworthy (cf. Miller, *op. cit.*, pp. 172, 173). If the defenders of the 'will to believe' cite history, therefore, it is competent to their opponents to demand consideration for the historical elements in their own contention. The solution appears to be: (*a*) the faith-philosophy, moderately stated, occupies a defensible position; (*b*) nevertheless, the criticism of the 'rationalists' shows the point where it is most open to attack and where further development must begin. This is the slackness in determining the grounds and, especially, the criteria of

belief. The task has been attempted, indeed, *e. g.*, by Kant (the faith of *reason*); by James (the mingled psychology, noëtics and ethics of 'genuine options' etc.); by those who base belief on judgments of ideal worth. But the bearing of the history is not to urge any one or any combination of these as correct, but to evidence the necessity of some such development of the doctrine in question.

Development of Voluntary Motion. By E. A. KIRKPATRICK. (To appear in full in THE PSYCHOLOGICAL REVIEW.)

The case of a child of seventeen months that had never tried to stand or walk alone, who, upon seeing some cuffs on a table, crawled to it, pulled herself up, put on the cuffs, then walked and ran all over the house, was reported. The claim was made that movements, such as walking, that seem to be learned, are in reality largely inherited, and that other nervous and muscular connections are less a matter of experience than is usually thought. It was shown that Professor Baldwin's principle of reproduction of favorable stimuli by an organism must depend upon certain physiological connections, and that chance is a less important factor in the selection of movements for repetition than Baldwin has indicated. It was claimed that there is a physiological space relation between different tactual and visual stimulations and the movements they call forth. In learning movements the attention of the child is concentrated upon the stimulus and the end to be gained, and there is little or no consciousness of the movements themselves. Therefore, to analyze any manual task to be learned into its elementary movements and requiring each to be learned separately, then combined with others, and finally all used for an end, is contrary to the natural order, and a partial undoing of inherited connections that should simply be completed and perfected.

Report on the Effects of Cannabis Indica. By E. B. DELABARRE.

The effects of *Cannabis Indica* as determined by eleven tests on myself, in doses of 0.5 to 1.5 grains of the solid extract, may all be attributed to an induced hyperexcitability of the nervous

system—sensory, associational and motor. The particular effects are very variable, depending on a large number of factors. Many further tests are necessary. In general, a gradual increase in sensory, intellectual, emotional and motor activity occurs, lasting about half the total duration of the main influence; followed by a gradual decrease to normal or below. The increase is not continuous, but intermittent or rhythmical. The duration is from five to nine hours or more, though the influence is measurable for several days. No depressive reaction has occurred.

In the first half there is a tendency to hyperæsthesia, to increase in delicacy of discrimination, in rapidity of association and intellectual work, in richness of imagery and thought, in rate of pulse and breathing, with diminished depth of both; to decrease in muscular strength and steadiness, in secretions, in expansive but not in contractive reactions. In the second half, in case no fatigue occurs, there is a gradual intermittent return toward normal; if fatigue, a reversal beyond normal.

No noteworthy increase in illusions of suggestibility has occurred. Introspection has been trustworthy and valuable, largely increased in power. The state appears to be an exaggeration of normal states, tendencies and rhythms. Hence its enormous value in analysis. Besides the careful attention to gaining exact experimental results, which covered a much wider field than can be indicated here, interesting analyses were made of emotions, of motor influences in emotion, in discrimination, in geometrical illusions, of attention, association and expression, and of philosophical concepts.

In larger doses, or on other persons, the results might in some respects be different from those thus far obtained.

The Psychological Imagination. By DICKINSON S. MILLER. (Read by title.)

Certain Hindrances to the Progress of Psychology in America. By GEORGE TRUMBULL LADD. (Printed in full in THE PSYCHOLOGICAL REVIEW, March, 1899.)

Starting from the assumed truth that the progress of any positive science depends largely upon the quality of the men

who chiefly cultivate it, the opinion was ventured that psychology is not at present making in this country the progress which may be reasonably expected. It would seem, then, that the hindrances are partly, at least, matters of *personnel* rather than of *matériel*.

If we inquire more carefully into the particular hindrances of this order, the following seem to be among the more prominent: First, a certain aloofness of psychologists from, and a consequent ignorance of, the mental life and mental development of the common people. Without depreciating the value of any of the forms of specialization in laboratory or other allied work, the nature of psychology is such as to make a wide acquaintance with average human nature desirable, if not indispensable. In contrast with this hindrance, due to an excess of the scholastic spirit and method, is, second, the excessive amount of popular publications written by authors of insufficient scientific training. Connected with this is, third, the injury done to the science of psychology, in the estimate of the intelligent laity, by mannerisms of discussion and of the expression of tenets and discoveries, such as appear unfit for any body of men that are penetrated with the genuine spirit of science. The confession seems forced upon us that there is too little of reserve and dignity in controversy among psychologists as a class, and too much concession to popular demands that tend to lower our scientific standard.

But, in the fourth place, a certain invasion of the wide-spreading 'commercial spirit' seems likely to work harm to the science of psychology. The fear is not wholly unfounded, that this will cause an increase of personal and institutional rivalries and jealousies, of premature publication, of a somewhat disingenuous way of seeking for personal reputation rather than for the progress of science and for the welfare of mankind. On the other hand, fifth, psychologists do not, on the whole, maintain a sufficiently independent, yet teachable and friendly attitude to the other most closely allied positive sciences. An increase of a courageous but modest self-respect, and a determination to merit the respect of workmen in allied sciences, will undoubtedly do much to remove this hindrance.

The intention of this paper being only to speak of hindrances in so far as they belong to the *personnel* of psychology, reference to favoring conditions and to encouragements is, of course, omitted.

Reason a Mode of Instinct. By HENRY RUTGERS MARSHALL.

Instinct is commonly opposed to Reason.

The objective mark of an Instinct is that it determines in an organism typical reactions of biological significance to the organism. Subjectively we have 'Instinct feelings' when the reactions take place; when they are inhibited we have 'impulses.' The physical and psychical aspects of Instinct are as wide as life. Turning to the opposition to Instinct we find its objective mark in variation from typical reactions; this is indicated by hesitancy and then choice. Subjectively choice is represented by Will, and in our complex life the antecedent to choice is reasoning. As variation is, so choice and will are conceded to be, as wide as life; but so also, if analogy is any guide, must be the physical process antecedent to choice, and Reason the psychic coincident of this antecedent process.

Variation and reasoning both appear as reactions of a part of a complex physical and psychical system, as though it were an isolated entity out of relation to the whole system to which it properly belongs.

Variation is thus statable in terms of Instinct; and hence Reason itself must be looked upon as a mode of Instinct, the observed opposition between the two being due to the fact that Reason and Variation as we experience them are phenomena appearing in connection with psychical and physical activities of very complex organisms formed of complex systems integrated with still more complex systems.

Reason is thus referred back to Instinct. But Instinct, in its turn, is referable to the simplest of all phenomena of life—the reaction of a living cell to a stimulus. To this simplest of all reactions we therefore finally trace back both Reason and Instinct. The problems connected with the difference between Reason and Instinct are thus resolved into those connected with the determination of the relations between parts of systems—

of the nature of what we call the integration of psychical and physical systems.

Animal Intelligence and the Methods of Investigating it. By WESLEY MILLS. (To appear in full in the PSYCHOLOGICAL REVIEW.)

Comparative Psychology is advanced rather by systematic observations and experiments than by anecdotes, nevertheless the latter when strictly true are not valueless.

The study of the development of the animal mind (genetic psychology) is of the highest importance.

Insufficient attention has been paid to distinguishing between normal, subnormal and supernormal comparative psychology, an objection, however, which applies with a certain degree of force to human psychology. In making experiments on animals it is especially important that they be placed under conditions as natural as possible.

The neglect of this is a fatal objection to the work of the author of 'Animal Intelligence,' published as a monograph supplement to the PSYCH. REVIEW, Vol. II., No. 8, June, 1898.

The portion of this research referring to chicks is the most reliable, and the suggestions as to pedagogics, etc., valuable.

This investigator's experiments show that certain associations may be formed under highly unnatural conditions, which associations, etc., however, bear about the same relations to the normal psychic evolution of animals that the behavior of more or less panic-stricken or otherwise abnormal human beings does to their natural conduct.

It is not proven, as asserted in the publication in question, that animals do not imitate, remember, have social consciousness, imagination, association and perception; nor that their consciousness is only comparable to that of a human being during swimming or when playing outdoor games as understood by this writer. It is highly probable that animals, even the highest below man, have only rarely and at the best but a feeble self-consciousness, if it exists at all.

But on this point and on the question of inference, reasoning, etc., the time is not yet ripe for positive assertions.

It seems more than probable that the mental processes of the highest animals are not radically different from those of man so far as they go, but that the human mind has capabilities in the realms both of feeling and intellection to which animals cannot attain. While it is desirable to push analysis as far as possible, it is safer to remain in the region of the indefinite, and to refrain from making very precise and positive statements as to whether the animal mind does or does not possess certain powers, till we are in possession of a larger storehouse of facts, especially of the nature of exact and systematic observations (or experiments). *Festinate lente* is a good rule in regard to drawing conclusions in Comparative Psychology.

Psychological Classification. By MARY WHITON CALKINS. (To appear in full in THE PSYCHOLOGICAL REVIEW.)

The traditional theory that sensations have the 'attributes' of quality, intensity, extent and duration is unjustifiable, if the conception of sensations as unanalyzable and irreducible elements of consciousness is at the same time upheld, since the possession of attributes is synonymous with complexity. The admission of attributes is only possible on the theory that the sensation is not abstractly unanalyzable, but that it is rather the simplest possible concrete experience. But this hypothesis ignores the fact that percepts, images, emotions or volitions—never sensations, even in this looser conception of them—are the simplest elements of actual experience. Only as an abstract and hypothesized and unanalyzable element has the term 'sensation' any valid meaning in psychology; and on this definition there is no longer room for attributes of this irreducible datum, which, rather, is itself an attribute.

Scrutinized, each for each, the so-called attributes are readily classified on other principles. Duration distinguishes itself from all the rest in that it is attribute of physical as well as psychological phenomena, and, therefore, not attribute at all in a psychological sense—not an elementary content of the fact of consciousness, but a *reflection about* facts, physical and psychical.

Quality is identified with sensation-element by most writers, even by those who teach the attribute-theory. Similarly, in the

opinion of the writer, intensities can be shown to be sensation-elements, distinguishable and unanalyzable factors of consciousness; and extent, if not a sensational element, is a complex of such elements.

Exhibition of Instruments for the Study of Movement and Fatigue. By J. McKeen Cattell.

Apparatus devised for special research on movement and fatigue in the Columbia Laboratory was shown and described. Several of the instruments have been already published, but these are now being used for experiments in new directions. The instruments were as follows: (1) Apparatus for measuring the time of discrimination and movement. In addition to the arrangements for exact determination of a single reaction, instruments and methods were shown by which a series of processes can be measured by simple means. Experiments by Mr. Germann on the formation of motor habits were mentioned. (2) An ordinary grindstone was arranged so that reaction-times can be measured without chronoscope or chronograph. (3) Instruments and methods for studying the accuracy of movement, its force, time, extent and localization were exhibited, and experiments in progress by Mr. Woodworth were described. (4) An automatograph giving a continuous curve for extensor and flexor movements. (5) A spring ergometer intended to replace the Mosso ergograph. (6) A dynamometer in which the pressures are continually added and counted, making the study of muscular fatigue and the effect of mental conditions on fatigue possible without elaborate apparatus. All the instruments were shown in working order, and attention was called to the use in many cases of simple means in place of more complicated apparatus, and to the improvement of the latter in several ways, such as the avoidance of batteries, mercury for contacts, and smoked paper.

The Physiological Basis of Mental Life. By Hugo Münsterberg.

The psychologist must demand that the physiological theory of the brain processes shows a manifoldness of factors which cor-

responds to the manifoldness of the psychical elements. The theories of to-day are not satisfactory in that respect. Every psychophysiological excitement is considered as variable with regard to locality and amount of the centripetal stimulation. On the psychical side the quality of the sensation corresponds to the local variation of the sensory end station and the intensity of the sensation to its quantity of excitement. But this is an abstract scheme which makes the central process simpler than it is, as it does not take account of the fact that every central sensory process is at the same time the starting point of a centrifugal process which depends upon the disposition of the whole centrifugal system. This central discharge varies, of course, also in quantity and locality, depending upon the openness of the channels. If we consider the sensation as the accompaniment of the physiological process which transforms the centripetal stimulation into a centrifugal discharge, we have then a fourfold multiplicity of the central process. This allows us to account for two more factors of the sensation which cannot be reduced to differences of quality and intensity: the different degrees of vividness, down to the unconscious states, and the different subjective values, as, for instance, the time values, the feeling tones, the belief tone and many others. The vividness must be considered as dependent upon the quantitative amount of the discharge and the values dependent upon the local character of the discharging paths. Every sensation is thus by principle an innervation feeling and its physiological basis is equally dependent upon the processes in the sensory system and in the central motor apparatus.

On the Confusion of Tastes and Odors. By G. T. W. PATRICK.

This was a preliminary report upon some experiments upon taste and smell made at the Iowa Laboratory. The experiments were made upon a subject having complete congenital anosmia and upon normal subjects acting as controls. The subject was first tested with about one hundred odorous substances, including those from all the nine classes of odors given by Zwaardemaker. None of these gave any sensation or reaction whatever. Two other classes of substances, however, gave

reactions, the first being sensations of touch and the second sensations of taste. As examples of the former, are menthol, sulphurous oxide, acetic acid, ammonia and various ammonia compounds. As examples of the latter are chloroform, ether and pyridin.

The subject's sense of taste was then tested, and the sensibility to simple tastes found to be about normal.

Then followed a series of experiments upon taste made upon the anosmic subject and simultaneously upon two normal subjects to determine so far as possible the part played by sensations of smell, touch, temperature and sight in so-called taste sensations as given in ordinary foods and drinks. These experiments extended over about ten weeks and included one hundred and eighty-five such substances, sensations of sight and temperature being eliminated as far as possible. About half a teaspoonful of each substance was given to each subject, who was allowed to smell it and taste it as much as she wished and finally to swallow it. The substances were divided, according to the results, into three classes. The first were those recognized both by the anosmic and the normal subjects. These would be presumably the foods and drinks recognized by the sense of taste alone, but an examination of the list which included the various spices, different kinds of syrups and molasses, cherry juice, etc., offered some grounds for the conclusion that, with the exception of typical simple tastes, such as sugar, tartaric acid, quinine, etc., the recognition depended in every case upon the senses of touch and temperature. The second class included those substances recognized by the blindfolded normal subjects but not by the anosmic. Presumably they would depend upon their odor for their recognition. They were as follows: coffee, tea, normal alcohol, port wine, claret, vinegar, spirits of almond, tincture of rhubarb, vanilla extract, absolute alcohol, tincture of ginger, chocolate, cocoa, milk, milk and water, sour milk, nearly all the common fruits, boiled turnip, raw and boiled onion, yoke of boiled egg, white of raw egg, oil of rose, and kerosene. A third list of substances included those recognized by one of the normal subjects but not by the other nor by the anosmic. A fourth list included the substances

recognized by none of the blindfolded subjects. Among other conclusions, the following was drawn: what commonly passes for taste sensations, so far as their discriminative or intellectual value is concerned, is the composite result of the mingling of sensations of smell, touch, temperature, sight and taste, the latter, however, playing little or no part in the discrimination of our common foods and drinks. Taste sensations proper furnish rather the emotional element in the total conscious effect. Sweet things we call 'good,' and bitter things we call 'bad,' while salt and sour, if, indeed, they are simple taste sensations, add a certain piquancy which is pleasing when they are not excessive.

Methods of Demonstrating the Physiology and Psychology of Color. By E. W. SCRIPTURE.

The most complete and effective method of teaching color is by means of the tricolor lantern. This is a special kind of triple lantern which I now show you. The idea of color projection in this way originated, I believe, with Du Hauron; this special lantern is the invention of R. D. Gray. It is arranged for lime-light, as the color work cannot be done with electric or acetylene light. The three jets are packed closely into one lantern-body. The three condensers are as close together as possible. Three lenses exactly alike are mounted on the front board. The jets have all adjustments for regulating the gas, manipulating the lime, etc. Limes turned in the lathe are used in order not to disturb the focus as they are rotated in the lantern. Regulators are placed on the cylinders.

Three colored films, red, green and blue, are placed in the triple lantern. I now show you a slide which gives on the screen the elementary colors singly with their combinations in pairs and in triple. Shades are shown by slowly turning the light down. The various hues and the laws of combination are illustrated by varying the intensities of the jets. The properties of the color triangle and the color pyramid are thus illustrated. Hues, tints, shades and complementaries are readily explained. When the laws of color have been thoroughly impressed by this method, slides of concrete objects are used for study. Thus,

a group of flowers affords an illustration of the automatic solution of color equations.

The phenomena of color blindness can also be represented with the tricolor lantern. The usual theory of color blindness, according to which the defect arose by the failure of one of the three fundamental colors, can be illustrated by covering up one of the lenses. For red blindness the red lens is covered, and the resulting picture appears in combinations of green and blue; for green blindness the green lens is covered, and for the hypothetical blue blindness the blue one is covered. To illustrate the newer theory, the blue slide is left unchanged, but two slides are made for red and two for green. For the dichromats of the first class—the red-blue persons—the two slides taken through the red ray filter are placed in the red and green lanterns.

The method also furnishes a remarkable analogy to the decomposition of the colors by the eye into three fundamentals and their mental recomposition into sensations of color. The tricolor views are taken by a camera used three times in succession with a differently colored screen each time. The red rays impress one of the plates, the green rays the second and the blue rays the third. The three negatives differ in their shading. Three positives are made which differ likewise. The three positives produce views appropriately shaded when projected on the screen by the colored lights. The result is a recomposition in natural colors. The approximation to the original colors is close if the slides are properly made and manipulated.

Finally I will call your attention to the latest development of lantern projection in color. Only one lantern is used. Several methods have been tried; this one—which is not original with me—seems to be the only thoroughly successful one. It is here shown publicly for the first time. Three views are taken of the original object in the usual way through color screens. The three negatives are then used to produce three positives at the same place between two glass plates. These three positives are separately colored in red, yellow and blue dyes. The light transmitted through the slide then shows the original colors of the object photographed. As these views can be used with an electric lantern, the most brillian tand beautiful effects can be produced.

Rates of Breathing and Degree of Mental Activity. By J. E. LOUGH.

The paper is a report of an experiment performed in the Psychological Laboratory of Wellesley College upon thirty women, students and teachers in the college. Visual stimuli, consisting of water-colors, printed pages to be read silently, and series of indicated simple mathematical operations to be carried out silently, were given to the subjects, always under exactly similar conditions, each stimulation lasting about forty seconds. Records of the rate of breathing were taken during stimulation and for the forty seconds preceding and for the forty seconds following stimulation. The average rate for the forty seconds preceding a given stimulation is taken as the basis of comparison for that experiment, and the average rate during the stimulation and following the stimulation is always reduced to a ratio of this standard. By this method only changes of rate are shown when such a change takes place within one of given periods, thus eliminating all changes not produced by the one variation of the subject—that of the presence or removal of the stimulus. And since only the relative changes are shown, it is possible to make direct comparisons of the effect of stimulation without regard to the absolute rate of breathing.

The experiments show a rather wide range in the effect of a given stimulus. But the average of the effect the stimulus has had upon all subjects eliminates the individual differences and shares its general influence. There is in every case an increase in the rate during stimulation and a return to the standard afterwards. But the amount of this increase, produced by a given stimulus, corresponds in a general way to the degree of mental activity produced.

Recent Investigations at the Harvard Laboratory. By ROBERT MACDOUGALL.

Recent Investigations at the Yale Laboratory. By E. W. SCRIPTURE.

(*a*) *Investigations in the Psychology of Speech.* Gramophone plate records of prose, poetry or music are obtained in

such a way that time, stress, quality, etc. of the elements of speech can be accurately measured. Results were reported in brief.

(*b*) *Cross Education.* Experiments showing that training of a digit on one side of body is followed by increase in ability of all the others, even though not practiced. Hypothesis is, physiologically speaking, that the development of the center governing a particular member causes at the same time the development of higher centers connected with groups of members. Psychologically speaking, development of will power in connection with any activity is accompanied by a development of will power as a whole.

(*c*) *Investigations with Currents of High Frequency.* Sinusoidal alternating currents of varying frequencies were produced by a Kennelley generator. The generator was run by a motor, which was started at slow speed. The speed was gradually increased, alternation becoming more frequent. Electrodes were applied to the finger. The sensations were as follows: at low frequency there was no sensation; as the frequency was increased the threshold of sensation was reached. At a higher frequency the threshold of disagreeableness appeared. At a still higher frequency pain appeared. At a still higher frequency the pain ceased and an agreeable numbness was perceived; at a still higher frequency there was a faint sensation only. I was not able to run the generator high enough to cause sensation to disappear totally, but it would undoubtedly have done so, as we can infer from Tesla's experiments.

In the course of these experiments observation was made that rapidly alternating currents could be used to produce anæsthesia and analgesia to touch and cold (though apparently not to heat). We are now developing an apparatus to apply this discovery practically. Our latest attempt—not yet completed—consists in running a light arm with a contact around a rim containing 1,000 saw cuts filled with hard rubber. The arm revolves about 100 times per second, giving 100,000 interruptions per second. The results will be announced shortly. The importance of such a convenient method of producing anæsthesia without any of the dangers or inconveniences of ether, chloro-

form, nitrous oxide gas or cocaine, makes us hope that the method may soon be made practical.

Recent Investigations at the Illinois Laboratory. By J. P. HYLAN.

I. *The Division of Attention.* The object of the following experiments was to throw some light upon the problem as to whether the attention can, as is generally believed, be divided.

A screen placed before a revolving kymograph drum has in it a small opening so placed that a series of lines passes immediately behind it. Without knowing the number of lines, the subject is directed to fixate his gaze upon a fixation point half a centimeter from the opening, and count the lines as rapidly as possible, the drum first rotating rapidly and then being gradually slowed down until the correct number can be given with a fair degree of certainty. The time needed for counting a single line was calculated. Besides the series with a single screen opening, series with two, with three, and with four openings respectively were tried, each opening having its series of lines, and the fixation mark being used as at first. The method of the experiment was also the same, except that with more than one opening the subject was directed to divide his attention if possible and count all the lines that appeared in the several openings.

The problem was also approached by means of auditory sensations. Single, double, triple and quadruple series of musical clicks were used, and the time for counting a single click in the different series was obtained, as in the last experiment. In other than the single series the clicks came in succession and each was of a distinctly different pitch.

Results were given which argue, in the main, against the division of attention.

II. *Effect of Amount of Motor Impulse on Motor Memory.* In this experiment Münsterberg's muscle apparatus was used, with one of the pans weighted with 200 grs., 500 grs., 1,000 grs. and 1,500 grs., in order to make the carriage move with varying degrees of difficulty. Each series with a weight was followed by a series without a weight to act as control. When

each subject had gone through each series, the experiments were repeated with the carriage pushed instead of pulled as at first, to vary the effect of the joint sensations, and also repeated with an interval of 10 and of 30 seconds between the first and the repeated movement.

The results show that the repeated movements were distinctly more accurate in pushing than in pulling, and that this difference was greater with the weights than without them. The weights seem to have been a disturbing factor, but much less so for pushing than for pulling. In pushing, the tendency was constantly to underestimate the distance, but to do so by a fairly constant amount.

Recognition under Objective Reversal. By GEORGE V. DEARBORN. (To appear in full in THE PSYCHOLOGICAL REVIEW.)

This research, conducted in the Harvard Psychological Laboratory during the first five months of 1898, is a study of the relative recognizability of objects turned or reversed in each of the four quadrants and in the mirror-reversal and always in a plane at right angles to the line of sight. The essential apparatus employed was a set of 368 chance blots of ink made on white cards 4 cm. square, and arranged in series of ten with three reversals in each series. These objects were exhibited to each of the nine subjects, and their judgments as to recognition recorded by means of precise electrical mechanism and a kymograph. It was found that the repeated characters when one-quarter reversed over toward the left were recognized 61.4% as often as were those unturned; inverted, 72.8%; three-quarter reversed, 47.1%; erect mirror-reversed, 65.7%; and inverted mirror-reversed, 45.7%. In other words, it appears that an object is recognized more readily when inverted then when in either of the two intermediate positions, and more readily also than in the erect mirror-reversal or in that position inverted.

It is suggested that these empirical results may be in part explained respectively by the law of habit; the optical conditions of vision; the fact that we habitually perceive the upper left-hand corner of a flat object first; and by our familiarity with mirrors, natural and artificial.

Further Measurements of Pain. By ARTHUR MACDONALD.

Tables of measurements made by the writer were distributed, and the conclusions reached were as follows:

1. In general the sensibility to pain decreases as age increases. The left temple is more sensitive than the right. This accords with former experiments that the left hand is more sensitive to pain than the right hand. There is an increase of obtuseness to pain from ages 10 to 11; then a decrease from 11 to 12; then an increase from 12 to 13. From 13 to 17, while the right temple increases in obtuseness, the left temple increases in acuteness. This is in the post-pubertal period. There is a general variation, which experiments on larger numbers might modify.

2. Girls in private schools, who are generally of wealthy parents, are much more sensitive to pain than girls in the public schools. It would appear that refinements and luxuries tend to increase sensitiveness to pain. The hardihood which the great majority must experience seems advantageous. This also accords with our previous measurements that the non-laboring classes are more sensitive to pain than the laboring classes.

3. University women are more sensitive than washerwomen, but less sensitive than business women. There seems to be no necessary relation between intellectual development and pain sensitiveness. Obtuseness to pain seems to be due more to hardihood in early life.

4. Self-educated women, who are not trained in universities, are more sensitive than business women. Giving, then, the divisions in the order of their acuteness to the sense of pain, they would stand as follows: 1st, girls of the wealthy classes; 2d, self-educated women; 3d, business women; 4th, university women; 5th, washerwomen. The greater sensitiveness of self-educated women as compared with university women may be due to the overtaxing of the nervous system of the former in their unequal struggle after knowledge.

5. The girls in the public schools are more sensitive at all ages than the boys. This agrees with the results of our previous measurements that women are more sensitive to pain than men.

These measurements of least disagreeableness, or of thresh-

old of pain, are approximate measurements of the combination of nerve, feeling and idea. The temple algometer designed by the writer was also described and exhibited.

Theory of the Will in Aristotle's Ethics. By WM. A. HAMMOND.

The two component elements in the ethical will are the Practical Reason (*νοῦς πραχτικός*, *De an.* 433ª14, 16; 404ᵇ5; *Eth. Nic.* 1142ª 23–30; *διάνοια πραχτική*, *De an.* 433ª 18) and Desire (*ἐπιθυμία*, *De an.* 432ᵇ6 seq.; 433ª 2; *ὄρεξις*, 433ª 15 seqq.). Desire, as Aristotle employs it, is not a purely pathic element or a mere feeling of pleasure or pain. He describes it as an effort after what is pleasant; *i. e.*, he includes in it an activity element (433ª24 seqq.). It is feeling with an added quality of impulse or *Trieb*. It involves further an idea or presentative element. The details of Aristotle's analysis of desire are, therefore, (1) Idea. There can be no desire without an image (*ὀρεχτὸν δὲ οὐκ ἄνευ φαντασίας*, 433ᵇ28). (2) Feeling. In every desire the element of pleasure or pain constitutes the stimulating force to action (433ª 21; 1111ᵇ17). (3) Effort or activity, the actual impulse to pursue or avoid (433ª9, 13; 1139ª22). Between the practical and theoretical reason Aristotle draws a distinction. The theoretical or speculative reason deals with necessary truths (432ª24 seqq.; 1139ª10 seqq.), the practical reason operates in the sphere of choice and of the variable; the theoretical reason does not command, is concerned with the true and false; practical reason is imperative, is concerned with good and bad, judges, weighs, determines; its sphere of activity is the sphere of conduct. The characteristic virtue of the practical reason is prudence (*φρόνησις*). While prudence describes the moral quality of the practical reason, the method of its operation is described by the practical syllogism (434ª16–20; 1147ª1–7; 1144ª31 seqq.). The Practical Reason contains a jussive or epitactic force; the desire contains an active quality of impulse. Aristotle defines the moral will, therefore, as reason stimulated by desire or desire penetrated by reason (1139ᵇ4). The moral will, as this complex of reason and desire, functions under the modes of (*a*) deliberate choice and (*b*) freedom, and issues by means of par-

ticular acts in (*c*) fixed habit or the persistent character. As Aristotle regards the whole of psychical life as impulse or activity tending towards the realization of a potentiality, one may find in this doctrine of ἐνέργεια the correspondent of the non-moral or metaphysical will of the moderns. The will of Ethics, however, the *voluntas intellectivus* of Aquinas, is conceived of as feeling acting under the forms imposed by reason.

Psychology and Ethical Scepticism. By W. G. EVERETT.

Is a science of ethics possible? Ethical scepticism has denied its possibility. Each individual, by virtue of a peculiar nature, is a law unto himself. Moral laws are the rough compromise which convention effects to render some sort of social life possible. They have no natural or rational sanctions. To escape these difficulties appeal has been made to religion with its supernatural sanctions. But this is fatal to a science of ethics and is practically unsatisfactory, as large numbers are untouched by supernatural sanctions. Like difficulties confront a metaphysical ethic. A metaphysic of ethics is valid and necessary, but as a complement, not a substitute, for a science of ethics. The existence of natural and rational sanctions is presupposed by such a science. Many profoundly believe that there are adequate sanctions in human experience. Can they be reduced to scientific form? If so, we must have an adequate psychology of moral experience. Ethics requires not only a social psychology but also a psychology of the subtler phases of individual moral experience. What then is the relation of the ethical elements of consciousness to the total conscious life of the individual? What part do these elements play in mental development? How do they stand related to mental deficiencies and excellencies? What are the results upon the affective states of such vices as envy, jealousy and self-seeking? In states of *ennui*, despair and pessimism are there elements which result from ethical deficiencies? Is it true psychologically that lust and greed are the sure seeds of uneasiness and dissatisfaction? To answer these and similar questions satisfactorily would be to ground moral law and its sanctions in man's own nature, and at the same time securely to establish the science of ethics.

Professor Baldwin's "Social and Ethical Interpretations in Mental Development." By W. CALDWELL.

This paper was an attempt at a positive and appreciative criticism of Professor Baldwin's second volume on Mental Development, the *Social and Ethical Interpretations*. Mr. Baldwin's book achieves the object of its endeavor—the exhibition of social organization and personal (mental and moral) organization under the same psychological principles. Its classical recognition of epistemological principles is one of its merits, and it confines itself, on the whole, to the genetic point of view. The apparently ever-recurring circular process from the 'self' to 'society' and from society to the self and then back again, instead of being, as some critics maintain, a drawback or defect of the book, must be studied as part of its central lesson and main contention. Mr. Baldwin does not exactly assume, without any explanation, the self and society; he assumes the fact of mental development, and then, when studying its beginnings and its different phases, finds that it involves the conception and the reality of the self as a *socius*—as one term or another in a related thought or action content. The concluding sections of the volume, about the final and irreducible conflict between the moral man and society, are proof positive that its author believes in the reality of the human personality as something more than a mere phase of a 'social situation.' Nor is Mr. Baldwin's use of the genetic point of view a mere arbitrary procedure; he justifies his use of that method by letting us see that consciousness and conscious process cannot be understood apart from it.

The positive value of the work lies in the fullness of detail with which the relations of the thought-process to the movement-process are worked out. Its teaching about *imitation* as the social method *par excellence* must be taken along with what is taught in Mr. Baldwin's first volume upon that process. And then, lastly, the genetic point of view fully justifies the contention that society is a psychological organization. The book has a high general value at the present time, tracing, as it does, many important scientific and philosophic tendencies to their psychological roots.

The Genetic Determination of the Self. By J. MARK BALDWIN. (Read by title.)

Consists of sections added in the second edition of the author's 'Social and Ethical Interpretations,' in which some of the applications of the theory of the 'Dialectic of Personal Growth' are brought together more explicitly in view of criticism. It is to appear in full, under the title 'The Social and the Extra-Social,' in the *Amer. Journal of Sociology*, March, 1899.

Art in the Light of Modern Psychology. By G. TOSTI. (Read by title.)

A Study of Geometrical Illusions. By CHAS. H. JUDD. (To appear in full in THE PSYCHOLOGICAL REVIEW, May, 1899.)

The main thesis of the paper is that the underestimation of acute angles and overestimation of obtuse angles, which is a common feature of many illusions, is not a fundamental fact, but is to be explained as due to the false estimation of the length of the sides of the angles.

Overestimation and underestimation of linear distances are always accompanied by false judgments in the opposite direction in the surrounding field of vision. It is possible to find illusions in the surrounding field even when the figure suffers no internal illusion. These facts lead to the conclusion that such illusions are in general due to the shifting of points in their spatial relations.

The simplest form of the angle illusions, the Poggendorff illusion, is due to underestimation of the distance between the interrupted ends of the oblique lines, not to false estimation of the angles. This is supported negatively by comparison of the angles under a variety of conditions, under some of which the illusion appears, and under others of which it does not. Positive evidence is produced in quantitative determinations of the error in the estimation of the distance in question.

As in the case of the Poggendorff illusion, so in the estimation of all angles, whether subject to illusion or not, the estimated length of the sides is a most important factor. When the side is overestimated the angle is underestimated and when the side is underestimated the angle is overestimated.

Subjective Colors and the After-Image. By MARGARET FLOY WASHBURN.

This paper describes experiments designed to show the effect on the series of colors produced in the 'ringing off' of an after-image, by efforts to call up subjective color sensations of red, green and blue. It was found that the color changes of the image were very materially influenced by this process; traces of a given color in the image being intensified by central excitation until the entire image was tinged with the visualized color. Since the process thus investigated does not differ essentially from the process of voluntary attention to a given color, the experiments furnish evidence that attention has a positive, intensifying function, and they suggest that the increase of intensity on the part of the conscious state attended to comes not from a single 'attention center' but from associated centers of the same order as that which gives rise to the conscious state in question.

Three New Cases of Total Color-Blindness. By CHRISTINE LADD FRANKLIN. (Read by title.)

A New Color Illusion. By GEORGE TRUMBULL LADD.

A diagram on p. 50 of Fick's *Lehrbuch der Augenheilkunde*, used by the author to illustrate 'red-green blindness,' became the point of starting for an investigation not yet completed. The illusion, consisting of the complete disappearance of the red-colored letter *E* and the substitution of the color of the green background, was first noticed by Dr. George T. Stevens, of New York City.

Investigation has shown that strips of red, blue and orange, on a great variety of backgrounds, give the same illusion, although the orange seems to have a different way of disappearing from that followed by the other two colors. A marked difference was discovered between two classes of backgrounds. Green of two different shades, dark violet, dark blue, and black gave the illusion readily. But yellow, orange, gray, white, and a lighter blue or green, and a reddish violet gave the illusion with greatly increased difficulty or not at all. These colors

for the strips and backgrounds seem to retain their peculiarities even when combined on the same general field of vision.

Explanations of this illusion are not yet clearly made out. It may be partly due to the production of a temporary blind-spot. It seems to be connected, also, with the rhythm of attention in fixation. And there is some evidence that the substituted color is of a complicated cerebral origin. Further investigation will follow.

Report of the Committee on Physical and Mental Tests.

Professor Cattell, the Chairman, stated that, owing to the absence abroad during a considerable portion of the year of four of the five members of the committee, no regular meeting had been held. In any case, the committee needed trials and reports of the tests already recommended before further joint action could be taken to advantage. Individually the members of the committee had continued its work. In this regard each must speak for himself; at Columbia the tests had been regularly made and extended to include students of Barnard College, several new tests had been devised and tried, and a gymnasium examination had been arranged that added to the value of the tests made in the Psychological Laboratory. The sum of $100 appropriated at the Ithaca meeting had been in part distributed as follows: $25 to Professor Jastrow toward the cost of his card-sorting apparatus in order that it might be sold at a lower rate; $25 to Professor Cattell for record blanks, the blanks to be distributed, at the cost of press-work, to members of the Association wishing to use them; and $25 to Professor Warren for an investigation of individual differences in memory and imagery.

Tests for Sense-Type. By Howard C. Warren.

The following set of tests is proposed as a means of studying the comparative value of the several senses in the life of the individual. The object of the series as a whole is to determine the respective rôle of each sense in perception, association, memory, imagination, etc. The different tests take these functions up separately.

I. PERCEPTION TEST.—A simple passage of 400 words, containing 40 misprints, some of which appeal to the eye and others to the ear. The subject is asked to read the passage and mark the misprints. The proportion of misprints as a whole and of each kind is noted.

II. PERCEPTION-ASSOCIATION TEST.—A list of 50 words, chosen for their richness of sense-connotation, and so arranged that those in immediate succession are not likely to suggest images from the same senses. They are read to the subject, who is requested to state the kind of sense imagery suggested first, later, and most prominently, in each case.

III. MEMORY TEST.—Six series of nine figures each; to be dictated or shown to the subject, who is to repeat or write each series from memory after it has been completed.

IV. MOTOR-CO-ORDINATION TEST.—1. Writing on the forehead; the direction of the writing showing the relative importance of the visual and muscular factors in this function. 2. Five separate tests in mirror-writing (*i. e.*, looking into the mirror and writing so that the phrase shall read correctly in the mirror); the hand and paper are not seen directly—merely their reflection in the mirror; the mirror is placed at the right of the paper in two cases, and above it (*i. e.*, in front) in the rest.

V. MENTAL IMAGERY TEST.—The subject is asked to call up a vivid image of a definite sensation described to him; there are 11 tests; the time consumed in the effort is noted, together with the degree of success or failure.

VI. REACTION TEST.—Six series of ten reactions each; with natural, sensory and motor attention, and on sound and light stimuli respectively.

VII. QUESTIONNAIRE.—A set of questions to bring out the absolute and relative importance, for the subject, of various senses (including muscular) in certain respects.

These tests are expected to yield some useful data in the field of individual psychology. They should help in the final determination of a certain number of the general tests that your committee is seeking to formulate; and it is on this ground that the application is made for an appropriation from the fund allotted to that object.

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DISCUSSIONS.

THE MATERIAL VERSUS THE DYNAMIC PSYCHOLOGY.

It is not a little remarkable that in this era of dynamism in physical science and of various attempts at the application of dynamic concepts in psychology there have been so few really consistent presentations of the material of modern psychology from the dynamic standpoint. In this respect we recall hardly a recent book besides that of Jodl in which the old garment has not suffered from the addition of the new cloth. Titchener's text-book and, to a certain extent, that of Ebbinghaus are exasperatingly inconsequent in this regard. The net result of the experimental psychology, industriously cultivated during ten years, is admittedly so small, so far as facts are concerned, that it is a pity if it cannot at least give us a point of view.

The reason for this condition is not far to seek. It is because our psychologists have been narrow in their preparation and are consequently uninfluenced by the recent change of base on the part of molecular physics and higher mathematical concepts. It may be asserted that the student of psychology as well as of biology cannot hope to take a comprehensive view of his own domain without at least following the results of recent physical speculation.

A psychology which is so largely occupied with waves of air and pulsations of ether may be forgiven for speaking of atoms and molecules, but, inasmuch as a system of psychology is profoundly influenced by the ontological notions underlying it, one should have a care that the use of the convenient terms of conventional physics does not interfere with a logical development of the science. Still more pernicious is the effect of the 'matter idea' on current epistemology.

While it may seem incongruous for one who touches psychology from the side of neurology to present the claims of an immaterial psychology, it is hoped that it may not be without interest to psychologists by profession to receive the testimony of a worker in the so-called material substrate. Proceeding from the statement that psychology is the science of experience—of consciousness, in which all will agree, for the purpose of this discussion at least, it is apparent that the material presented to consciousness is in the form of activity. It does

not matter much that we admit with Professor Caldwell that consciousness is activity, for all we know of activity is based on its experience and on the result of inferences formed on such experience. The condition of passive receptivity is one which the neurologist cannot accept as in accord with anything we know regarding the nervous mechanism of thought. The elements of experience are all acts. Why is not psychology content to start with the actual dynamic units of experience and to use them till they are found wanting or until proof is forthcoming of the existence of material units in place of them? But, it is replied, it is one of the necessary laws of thought that forces must reside in some substance, that forces, in fine, are properties. We might be content to rejoin that this is an excursion into other than psychological fields, but we were but now complaining of the restricted range which psychology allows itself. The experimental psychologist of all men should be distrustful of hard and fast laws of thought. It is not long since he has had beautiful illustration of the possibility of living in a world where everything is wrong side up and yet acquiring the power to adjust his habitual way of seeing things to the new conditions most completely. It is impossible to say why it is any more necessary to the mind to conceive of forces as properties of matter than it is to think of matter as a convenient inferential classification form for force. Psychology would be more logical, more 'genetic,' if it would begin with the impersonal dynamic form of statement 'it rains,' 'there is a noise,' 'it mews,' 'it hurts,' etc., in describing experience. The fact that the various forces of experience are combined into secondary units of apparently simple experience does not impair the propriety of such usage. Excentric projection does seem to place our sensation in the end of the pointer, but we do not oppose this fact of experience to our knowledge that the mechanism of sensation is in the several discrete points in the fingers. We are reconciled to live in a world of illusions and realize that, so far as materiality is concerned, the rainbow is as real an object as the mountain over which its brilliant banner is unfurled.

A careful examination of the field will convince any one that the greater number of difficulties at present perplexing psychology are due directly or indirectly to the influence of the 'matter idea.' What reams of good paper have been spoiled in the attempt to explain or explain away the doctrine of psychophysical parallelism. What absurdities in the name of anatomy have been perpetrated in the effort to find a seat for the soul. How incompatible has it not seemed that there should be such a multiplicity of activities, but a single thread of consciousness.

But it may be clearly shown that physical science, which formulated the matter idea as a scientific postulate, has found it inadequate for its own purposes and contradictory of the facts in the more recondite applications in molecular physics. In support of this statement the reader is referred to the literature of the vortex atom, especially the mathematical physical discussions of Lord Kelvin, also to the address of the President of the Mathematical Section of the British Association for 1895. Dr. Hicks suggests that, when all is known, "it will be found that all phenomena are manifestations of motion (energy) in one continuous medium." The postulate of 'one continuous medium' is a concession to the supposed necessity of mediating between one form of activity and the next following, and this necessity is felt to be due in turn to the idea that forces are properties of matter. Having gotten rid of the material units, it were simpler to part with this idea of medium and accept the fact of interaction, which is quite as simple and intelligible as any machinery that can be devised wherewithal to explain it.

Among those who have attacked this question from the side of physicial science no one has more illuminated it than Professor Wilhelm Ostwald, professor of chemistry at Leipzig. In his well-known address before the naturalists, at Lübeck, he called attention to the unjustifiable extension of the physical law of the conservation of energy to form the metaphysical axiom of the conservation of matter. He says: "It is important to notice that by this extension a multitude of hypothetical elements have been introduced into the notion which was at first quite free of hypotheses. Particularly, in the light of this theory, chemical processes are construed in opposition to appearance in such a way that in case of chemical combination, instead of a new substance with new properties resulting from the process, the old substances remain in the new. Thus, in the combination of iron and oxygen to form ferrous oxide, although the familiar properties disappear and new ones take their place, we are yet to believe that the iron and the oxygen are somehow concealed in the compound and simply have taken on new properties. We have become so accustomed to this view that it is difficult for us to realize its peculiarity or rather its absurdity. But when we reflect that all that we know of any substance is the sum of its properties it appears that the assumption that a given substance is indeed present, but no longer possesses any of its properties, is not far removed from nonsense."

"As a matter of fact, this purely formal assumption serves merely to combine the commonplace facts of chemical processes, particularly stoichiometric laws, with the notion of an invariable matter."

"The assumption that all natural phenomena must be referable ultimately to mechanical forms is not entitled even to be regarded as a serviceable working hypothesis—it is a simple error."

"The most promising scientific legacy of the departing century is the substitution for the old mechanical view of nature of the energetic view." "If all that we know of the external world is in the form of relations of energy, what reason have we to assume in this external world something of which we have no experience? Yes, it is replied, but energy is simply a product of thought—an abstraction, while matter is the real. I reply, just the contrary. Matter is the theoretical thing which we have constructed, and that very imperfectly, in order to represent the permanent in the changeable of the phenomena. Now that we begin to understand that the actual, *i. e.*, that which acts upon us, is simply energy, we have to determine what the relative position of the two ideas is, and the outcome is not doubtful; it is that the predicate of reality can only apply to energy."

I have quoted these passages with the more pleasure because similar ideas have been uttered in my own class room for many years from the standpoint of biology and psychology. It may be permitted to repeat words used years ago but printed again in the *Denison Quarterly* in 1896. "The separation of force as distinct from matter is a secondary analysis—curious from its psychological side and wholly illusory and connected with limited conceptions of volition—and hence of causation. With all this sophistication we have forgotten or neglected that primitive naïve method of nature contemplation which views phenomena as phenomena, *i. e.*, as events, not as the apotheosis of something else—say of matter. There is no reason why we should discriminate against this view which involves the immediate acceptance of the data of consciousness as real." "The attempt to introduce the element or idea of cause at this point is to misapprehend the sphere of causation, which as limited and of subjective origin, has no place in ontology. What then is 'substance' which forms the ground of the phenomenal? We have seen that it is not necessarily matter. It might be shown, to mention one difficulty out of many, that no explanation of the molecular conditions of matter has been able to dispense with the postulate of a non-material ether. Our own answer to the question propounded is briefly: Substance is pure spontaneous energy. Energy is used to imply a doing without the implication of resistance, thus of effort. * * To speak of energy as *residing in* something is to introduce an utterly incongruous concept, for it continues our quest *ad infinitum*."

Now we venture to suggest that such a view of substance is of the greatest service to the psychologist, even though it may seem to the metaphysician to cut rather than to untie the Gordian knot. Accepting the data of experience as the foundation, a dynamic psychology, like a dynamic physics, seeks to construct its superstructure, not by the introduction of metaphysically postulated matter, but by combining the elements of experience. The organ of consciousness is adapted to analyze the various forces impinging on it by recognizing differences in the form and rate, in the kind and intensity of the stimuli, and these differences are the material of consciousness. It is idle to object that differences in mere form of vibration or mode of action are insufficient to account for the diversity of the essences making up the universe. That is exactly the question. Light waves of one rate produce upon the mind an impression totally different in kind from those vibrating at a slightly different rate, and the effect of electrical waves in one phase is quite unlike that of similar waves in another phase. In fact, the whole world of physics is a sphere in which observed differences are reduced to variations in rate and form of motions. It is this same idea that must make a permanent place for itself in psychology before further progress toward the simplicity of truth can be made. Nor should we feel that the dignity and worth of the psychical are lost by the recognition that it is one in essence with humbler activities. The sap that feeds the rough bark also nourishes the blossom. From the above point of view one may approach the vexed question of psychophysical parallelism with more confidence. It is not true that the body and soul are disparate and wholly incapable of interaction, for they are different expressions of the same force associated as parts of one system. It is not true that the two are identical, for they are different in form, and this difference is sufficient to distinguish physical and psychical *toto cœlo*. It is not true that one is the outside and the other the inside of the same curve; they are not different aspects of identity, but they are parts of the same system and so intimately related, but, being different in form, they are, in fact, different in essence. It is to be expected that these ideas will seem obscure to many by reason of their unfamiliarity, but we believe that the method is that of unsophisticated experience and that the results conform to the highest criteria of modern science. The application of this theory to the search for an organ of consciousness has formed the subject for a paragraph in an article in the *Journal of Comparative Anatomy* for March of the present year.

From this article I may be permitted to quote:

"The search for the organ of consciousness has remained unfruitful by reason of the total disparity between the conscious and any conceivable form of purely neural activity. Nevertheless it is plain that some sort of neurosis does, in every case, form the immediate preliminary to consciousness, and it is equally clear that not every sort of nervous excitation is an adequate occasion for the emergence of consciousness. The metaphysical nature as well as the peculiar unity and continuity of consciousness has militated against the idea of localizing this power, and has disposed to a dynamic view, viz.: that the condition of consciousness is not topographical but consists in the form of *activity*.

"It is plain that, in the nature of the case, it is impossible to discover a specific portion or a definite *kind* of matter in which consciousness resides, for no complexity of the material unit could make intelligible the diversity in consciousness, while *any* complexity destroys the objective grounds of unity. It is equally hard to discover any physiological basis for the continuity of consciousness. The idea of consciousness as a property is accordingly abandoned, and it remains to conceive of it as a *form of energy*. Pure energy with the attribute of spontaneity it could only be if it were in the mode of absolute equilibrium, in which its activities should be wholly reflected into themselves. This can only be predicated of infinite essence, and it is necessary to substitute the conditions of *relative* equilibrium in a sphere of interfering activities. The last few years have revealed in the cerebrum a mechanism of neural equilibration of unsuspected complexity, and all that we have recently learned of the physiology of the nerve stimulus only emphasizes the belief that the whole of the cortical complex is adapted to act as a unit though not as an invariable unit."

Nor does the energetic point of view simplify alone the problems of psychology. There has been a notable tendency in America of late to return to a vitalistic hypothesis in biology. It is no answer to those who advocate a vital force to state that such a force has not been isolated. It seems, when stated, a self-evident proposition that the receptivity of man, which by the limitations necessitated by the conditions of its development is adapted to admit certain segments of the infinite sphere of energy and no others, could not be expected suddenly to develop an 'organ' by which vital forces could be apprehended in other terms than those applied to physical forces. This is much the same difficulty as that experienced by the chemist when required by the biologist to afford him an analysis of living matter. The chemist

must first kill the protoplasm, and it will never be possible for him to affirm that the formula he determines expresses the state of aggregation of the living organism. Biologists, accordingly, have become modest, and admit that no forces have been found in living things not also common to inanimate objects. It is added that the peculiarity of living matter that distinguishes it from all inorganic substances is its power of coördinating the physical forces for the perpetuation of the individual existence or a chain of such lives. To say that the various physical forces are coördinated might mean that there is some outside force restraining them, or it might mean that by some means the several forces concerned are brought into a state of relative equilibrium by reason of interaction among themselves. Now, this state of equilibrium is simply a modified *form* of motion, and, as the differences between the several forces are, as we have seen, simply matters of form, we here have just what is necessary to constitute a new or different force as a result of the fusion of its components. When this form of action is disturbed, the force breaks up into the familiar modes of ordinary experience, and 'vital force' as such eludes our search. This does not prove that there is no such thing as vital force. In fact, we learn of vital force, as we do of any other of the forces for which we have no special 'organ,' by inferential processes, and this fact does not invalidate the inference. In view of the present tendency toward vitalism, it is simply desired to show that a form of this idea is justified from the dynamic point of view. There is just as much evidence for the existence of a vital force as there is of the existence of a force called electricity. Electricity and vital force are both forms of activity, and all activity has its roots in a common energy, the several so-called forces being simply various forms of its expression. Very much of what has been said of vital force applies, *mutatis mutandis*, to the psychical manifestations.

To the student of metaphysics who knows his Schopenhauer these conceptions are familiar. The author of 'The World as Will and Idea' said: "Matter is nothing more than causation. Its true being is its action." This is built upon a psychological foundation; but it must be admitted that the effect of metaphysics upon psychology has apparently been wholly insignificant. In conclusion, it may be noted that by the use of the term 'energy' for the universal, and 'force' for the limited manifestation of action, we reverse the usage of German writers, as may be seen, *e. g.*, in the recent work of Adolf Wagner, *Grundprobleme der Naturwissenschaft*, a work, by the way, that presents the metaphysical aspects of energetics in an attractive manner.

The writer's apology for thus trespassing on this field is his desire to promote a frank adoption of a dynamic method in psychology.

C. L. HERRICK.

UNIVERSITY OF NEW MEXICO, September, 1898.

THE POSTULATES OF A STRUCTURAL PSYCHOLOGY.[1]

This article is a *manifesto* of importance to all students of psychology and philosophy. Its question has become one of general importance,[2] and Professor Titchener, by virtue of his recognized achievements in his chosen field of psychology, and by virtue of his general official prominence, is more than entitled to deal authoritatively with conceptions about the scope and method and material results of experimental psychology.

I. The chief gains that accrue from this paper are due to what may naturally be called its *epistemological*[3] point of view. I do not altogether like to put the matter thus, for I do not wish to lose light of the positive psychology that it contains, or of its author's statement of its 'main object.' And I also wish to do all I can to remove the erroneous impression that, 'of course, philosophers never will make any serious attempt to get really inside the psychological point of view.' Mr. Titchener's epistemological point of view is defined in the first third of his paper in regard to the *scope* and the *divisions* of psychological science, and in the second two-thirds in regard to what he

[1] Cf. the article by E. B. Titchener. *Philosophical Review*, September, 1898, pp. 449–465.

[2] Professor Titchener informs us in a note, occupying the half of his first page, that his article 'contains a part' of his 'reply' to a criticism (published in this REVIEW, July, 1898) of his 'view of the psychological self,' made by me at the 1897 meeting of the American Psychological Association. His article has a value independently of that criticism of mine, and I shall not in the main speak of it as a reply to my criticism. My criticism was not so much of his 'psychological self,' as such, as of the fact that he did not seem to me to allow, in his treatment of the 'psychological self,' for some admissions that he made in certain general portions of the book. His present article opens up some important epistemological considerations which at once generalize and dignify our 'discussion.' It is, at the present moment, idle to deplore or ignore methodological and plain statements regarding psychology and psychological facts. There are not wanting signs, in a recent article (this REVIEW for November, 1898) by Professor Münsterberg, that he too has felt their necessity in dealing with some of his 'English' and 'foreign' co-workers and critics. The 'discussion,' too, of Professors Baldwin and Dewey in the November number of the *Philosophical Review* certainly turns upon epistemological considerations regarding psychology.

[3] Professor Münsterberg uses this word, *loc. cit.*

himself calls the *nature* and *number* of the structural elements of mind. As an outcome of the first part we recognize how true were the words of Mr. Stout, in his preface to his *Analytic Psychology*, about the coming of the time when no one man would any more think of writing a book upon psychology in general than he would think of writing a book upon mathematics in general. (A) Mr. Titchener distinguishes for us, with the help of biological considerations, (1) the psychology of structure or structural psychology, (2) the psychology of function or functional (descriptive) psychology, (3) ontogenetic psychology, (4) taxonomic psychology, (5) social psychology, (6) phylogenetic psychology. A 'very large portion of experimental psychology' is really structural or morphological psychology; it is a 'vivisection which shall yield structural, not functional results.' This is Mr. Titchener's chosen domain—the discovery of "what is *there* [in 'mind'] and in what quantity, not what it is there for." His own *Outline*, he would have us infer, deals with the first of the six different brands of psychology.

(B) "There can be no doubt that much of the criticism passed upon the new psychology depends upon the critic's failure to recognize its morphological character." Surely, then, no one in the future will criticise experimental psychology for not giving us what it does not profess to give. Indeed, we shall not do so if the said experimental psychology keep rigidly to its own point of view. (C) Mr. Titchener again tells us that structural psychology has not yet come to an agreement about more than the psychology of sensation and the constitution of the sensation element. He himself regards, as we know, the affection process to be also an elemental process. A majority of psychologists do this, he says, there being a minority who do not. "It is natural, in view of the intrinsic difficulty of the subject, that the psychology of feeling should be in a less settled state than the psychology of sensation." Going up higher, the 'anatomy of functional complexes,' *i. e.*, the structural study of the 'higher [mental] process,' the 'perceptions and emotions and actions handed down in popular and psychological tradition,' is as yet * * * a 'mere plan of arrangement.' (D) As to the second way in which the epistemological point of view is applied: "The elements of the experimentalists, as they themselves have been the first to acknowledge, are artifacts, abstractions, usefully isolated for scientific ends, but not found in experience save as connected with their like." This is emphatic enough. Let us not any more go to experimentalists and say: 'Your *sensations* and *affections* and *volitions* and *emotions* are very different things

from what we actually experience, are just so many poor, thin, caricatures of the organic experiences we feel in daily life.' He can reply to us that he is dealing with the structural phases of these processes, and that for more than that we had better betake ourselves to some of his colleagues. Now I think that I understand these four points. Let me look at *some* of their consequences, for I must be brief.

II. (1) As far as in him lies, should not a structural psychologist observe that accuracy of confinement within his own proper sphere that he request his critics to think about before attacking him? Mr. Titchener says things about functional psychology that may be questioned. (*a*) "It cannot be said that this functional psychology, despite what we may call its greater obviousness to investigation, has been worked out with as much patient enthusiasm or with as much scientific accuracy as has the psychology of mind structure." Far be it from me to compare the zeal or the patience of a body of men from the time of Aristotle to that of the English associationists with that of the heroic pioneers and workers in the experimental psychology of this century, but I shrug my shoulders and ask about the standard of 'scientific accuracy' implied in the preceding and the following sentence. "But it is also true that the methods of descriptive psychology cannot, in the nature of the case, lead to results of scientific finality." Finality on any one plane of investigation is a different thing from finality along some other plane. *Λέγοιτο δ' ἂν ἱκανῶς, εἰ κατὰ τὴν ὑποκειμένην ὕλην διασαφηθείη.* Mr. Titchener's conception of *science* in this article is, I think, to be inferred from his phrase about the arrival of the 'time' for 'the transformation [of psychology] from philosophy to science.' He means experimental science, as that is ordinarily understood, consequently he has no right to judge of functional psychology *merely* from his standpoint. And if some of his words in this article (to which I shall immediately refer) about the *last things* of mind were true, some of his other four psychological disciplines would also be 'in the air,'—be absolutely unscientific.

(*β*) Ought not a structural psychologist—and this point is even more vital—to be able to adhere rigidly to his 'structural' point of view, *at least within the realm of his own observation and scientific disputation?* I will adduce one or two reasons for saying that I do not find Mr. Titchener to do this. (*i*) He uses the expressions 'elemental processes' (457), and 'elements' (455, 462), and 'last things of mind' —I will not say *interchangeably*, but at least in a manner that makes it difficult for the reader to keep the 'structural' view persistently in

sight. I am only too painfully aware of the imperfections of language to press this point, although I cannot overlook it nor fail to see its influence in wrecking his own argument. I will, therefore, supplement it by saying that perhaps he ought to be held responsible (β) only for the use of the two 'elements' called with admirable precision the *sensation-element* and the *affection-element*. These two things bear the weight of his whole article. He is endeavoring to set forth the structural 'elements' (450, 453) in the elementary mental processes. And his result is (462): "The affection-element is constituted of quality, intensity and duration; the sense-element (sensation or idea) of quality, intensity, duration, clearness, and (in some cases) extent." But *quality*, *intensity*, *duration*, *etc.*, are not *elements;* they are *characteristics* or *categories* [of sensation and affection]. That is, despite his words *constituted* (and *constituents* (p. 450)), he does not analyze the sensation-element or the affection-element into simpler elements. Nor are the sensation-element and the affection-element themselves *elements;* they are *processes* or phases of *processes*. (Mr. Titchener uses the word *processes* again and again on pp. 457–8–9, and he compares his elementary processes to other alleged 'processes,' such as will-processes, etc.) Now are *processes*, or phases of processes, facts of structure or facts of sequence? I think that they are facts of sequence. Indeed, the very fact of *process* is not a fact of 'structure,' but something more than this. In short, Mr. Titchener does not succeed in maintaining the structural point of view throughout the central sections of his article. (γ) Terminology and statement apart, Mr. Titchener does not, in disputation, keep to his own confession that the 'elements of the experimentalists are artifacts, abstractions.' He *uses them as if they were real things*, and does battle with them against all other 'candidates' for 'elemental rank,' such as alleged will-process. He uses them not merely 'for scientific ends' but for dogmatic and ontological purposes. "What (459) is our justification for looking upon them ['these different processes,' preceding sentence] as last things of mind?" How, I ask, can an 'artifact' be a *last thing* of mind? A *last thing* of mind might, *e. g.*, be the *connection* which Mr. Titchener tells us always exists between these elements, but not the element as an 'artifact.'[1]

[1] I purposely overlook Mr. Titchener's 'anatomical' reasons for regarding sensation and affection as last things of mind. The 'irreducibility' test and the physiology test yield different results to different psychologists, and would yield different results to Mr. Titchener's six psychologists. Mr. Baldwin, *e. g.*, representing Mr. Titchener's *fifth* kind of psychology, claims that the mind cannot think of itself save as one term of a social relation. The inability of mind, if

III. What I do find in Mr. Titchener's article is a double point of view about structural psychology. (1) The conception of structural psychology as denoting the accredited results of a certain point of view regarding mental process or processes, to wit, the point of view characterized by the categories of quality, intensity, quantity, duration, etc. (2) The conception of structural psychology as depending upon certain peculiarities in its object-matter, to wit, that its object-matter is mental 'elements,' irreducibles of some kind or other. I think that the first point of view is successfully set forth by Mr. Titchener as the point of view adopted by experimental psychology, and, in general, it is my opinion that experimental psychology should seek to differentiate itself from the other five psychologies, not by its subject-matter (for surely its hope is to treat *all* mental processes experimentally), but by its point of view—its 'categories.' And I think that the second point of view breaks down in Mr. Titchener's own hands. This is enough for my purpose. Of course, I believe that it will break down in anybody's hands.

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PSYCHOLOGICAL METHOD.[1]

These three articles of Mr. McDougall (read as papers before the *Aristotelian Society*, London) seem to have an undoubted relevancy and utility at the present time, when the subject of psychological method is for various reasons being actively discussed. They accomplish their purpose, if by *method* we mean (with Mr. McDougall) not so much ways and means of going to work in psychology, but the *method of conceiving the scope of psychology and of psychological processes.* By their contention that there can be 'no complete science of *conscious* processes' as such, they will be welcome to the experimentalists; while, by their view of the dynamic function of consciousness and of the *efficient* or active relation sustained by 'conscious' to 'neural' process, they will gratify the opponents of what, in the re-

real, is a *last thing* about the mind, just as much as the perception of color. In one regard it is a 'complex' fact; in another it is a simple and *irreducible* fact. The physiology test, again, yields the fact of *function* as a last thing about mind. A physiological expert, *e. g.*, Mr. J. S. Haldane, insists (*Nin. Cent.*, Sept., '98) on the difference between physiological and mechanical process, by holding that physiology studies vital functions. All this shows that no one kind of psychology is entitled to talk about the last things of mind.

[1] *A Contribution towards an Improvement in Psychological Method.* W. McDougall. *Mind*, New Series, Nos. 25, 26, 27, January, April, July, 1898.

gion of mind, since the days of Leibnitz, has been called *automatism*. They provide, in other words, for the unification of our conceptions regarding the relation of 'conscious' to 'neural' process. Let me outline the argument.

Leading psychologists of to-day (*e. g.*, Ward, James, Stout), of course, recognize in their writings *functions of the mind* instead of *faculties of the soul*, and they also allow of the existence of processes not easily recognizable by direct introspection and, in fact, usually discoverable only by inference. They do not, however, set forth clearly the relation of the 'unconscious constituent' (Stout) to the flow of mental activity or to the ordinary *presentations* (Ward) of the mind. The doctrine of the simple concomitance of mental and neural process as represented by various writers is objectionable for two reasons: (1) it cannot be brought into relation with our general conception of causal sequence; (2) the teleological reason that any phenomenon (consciousness, in the present instance) that constantly appears in any group of animals has a part to play in the development of the individual or the species. There are various forms of the concomitance or the parallelism doctrine, but they are all unsatisfactory.

What, then, to simplify matters, are the conditions of the occurrence of consciousness *in terms of neural process?* The answer is that consciousness seems to occur wherever *new experience* has to be acquired. Experience means the establishment of new relations among nerve cells and their processes; it is the establishment of new relations among neurons. This view is tested by careful analysis and illustration in Mr. McDougall's second article. The nervous system of a mammal seems to consist of superposed systems of reflex paths, together with a great mass of neurons (*i. e.*, nerve cells and their processes) at the top of the systems, not yet or only imperfectly organized into reflex paths. His biological and physiological theory of conscious process is in agreement with Stout's doctrine of *apperception* as the process by which a mental system appropriates a new element or otherwise receives a fresh determination. In terms of neural process apperception must be conceived as an extension and further complication of a mental system by the incorporation into it of other neurons and systems of neurons, so that the complex path leads to a modified efferent outflow.

The logical inference from the foregoing is that "all adaptation of nervous reaction to environment has been accompanied by consciousness," and that "the organization of the simple reflexes and instincts of the lower animals was accompanied by a consciousness of a very

low kind." In man the reflexes of the cord and lower part of the brain were organized long ago, before man was man, and some low form of consciousness accompanied their organization. The highest organism is not the one whose nervous system is most completely organized for reaction upon a limited environment, but the one whose nervous system affords the greatest possibility of new adaptations, and so of the most complex and intense consciousness. Consciousness, then, is the force that makes mind, that makes of neural process *experiences*.

All this is set forth in Mr. McDougall's articles with admirable clearness and competency, on the basis, too, of much exact scientific and philosophical scholarship. They are a kind of touchstone on which the psychologist of 'structure' or the psychologist of 'function' or the philosophical psychologist may try the validity and the actuality and the relevancy of his ideas on mental processes or on the '*positive* science of mental process' (Stout). And there are a few metaphysical thoughts, at the close of the third paper, on the relation of consciousness to 'other existents' (Shadworth Hodgson). I should much enjoy discussing these in another place. The upshot of the exposition is that no psychologist should allow himself to think of any line of absolute separation between psychical and neural process. This is the simple outcome of the teaching of biology and physiology —sciences from which, in my opinion (and it is obviously Mr. McDougall's), both the psychologist of function and the psychologist of structure have still much to learn. It is manifestly absurd to think of neural process as a thing altogether complete in itself before the irruption of consciousness, for, as Mr. McDougall points out, we are warranted in crediting the simplest organisms with a kind of consciousness. From the *genetic* point of view in psychology (represented, for example, in Professor Baldwin's recent work) we may see in our neural and automatic and instinctive and 'unconscious' processes the organization of experience that was slowly and consciously acquired in the past. The whole difficulty in which psychologists find themselves concerning the relation of conscious to 'unconscious' process is due, I think, to the old tendency of thinking of consciousness in the Cartesian way as the representation of 'representations,' *altogether apart from the fact of the activity or experience process of the organism*, or apart from the fact that our consciousness of the self is not static but dynamic, and that our consciousness makes us aware only of the thought relations of an experience process or content.[1] All this has

[1] I have tried to show this in my '*Schopenhauer's System in its Philosoph-*

become most apparent from recent psychological discussion.[1] But to Mr. McDougall we must express our obligations for formulating the question of the relation of conscious to neural process as one lying at the threshold of our conception of the scope and province of psychology.

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ical Significance' (Blackwood. Scribner's, 1896. Reviewed in this REVIEW Nov. 1, 1896).

[1] Even Stout, *e. g.* (*Analytic Psychology*), argues for the idea that psychology may be considered as 'the science of the development of mind.' Elsewhere he says that the 'individual's consciousness is but a fragment of the general system of the world.' And Baldwin (*Mental Development*, p. 3) expresses the same surprise that I have already referred to, that the 'new psychology has hitherto made so little use of the genetic (or biological) point of view.' James, in his *Principles of Psychology*, talks of the 'efficiency of consciousness' in a way that is altogether in advance of Cartesianism or presentationism.

PSYCHOLOGICAL LITERATURE.

PSYCHOPHYSICAL AND PHYSIOLOGICAL.

The Reaction Time of the Heart, of the Vaso-motor Nerves and of the Blood Pressure.

Some Reflections and a Hypothesis upon the Form of the Capillary Pulse. A. BINET. L'Année Psychologique, 1898, pp. 316–336.

The Influence of Prolonged Intellectual Work upon the Rate of the Pulse. N. VASCHIDE. Ibid., pp. 356.

The Application of the Graphic Method to the Study of the Intensity of the Voice. B. BOURDON. Ibid., p. 369.

In his first article M. Binet reports some experiments made with plethysmographic methods in the attempt to determine the time required for reaction by the various organs indicated in his title. Thus, for example, with a plethysmograph attached to one hand, his subject was required to press with the other upon a dynamometer. The point at which the heart-beat accelerated was then determined, and the time between this and the pressure of the dynamometer gives the duration of the heart reaction. M. Binet discusses a number of sources of error, which are numerous, and gives as an approximate figure for the average of such reactions 1.5 seconds. The vaso-motor reaction averages 3.5 seconds. Other observers have shown that the small vessels react much more slowly than the large ones, so this average is somewhat equivocal. The experiments in pressure were not successful. The difficulty encountered [using Mosso's sphygmomanometer] rests on the inter-relations of changes in pressure with changes in vaso-constriction. It is very difficult to isolate these factors from one another. The second article is dedicated to showing the inadequacy of the generally accepted statement that increase of pressure causes a decrease in the distinctness of the dicrotic. The vascular tonus, the force of the heart-beat, the quantity of blood and the rate of blood-flow all play a part in the determination of the form of the pulse. A series of facts is cited to show the contradictions involved, if change in pressure is alone invoked to explain the changes in the dicrotism. Vascular tonicity and high pressure apparently are antithetic to one

another, the former resulting in increase, the latter in decrease of the dicrotic. M. Vaschide reports his observations, extending over a number of days, showing that intense intellectual labor, when continuous throughout such a period (the most striking results occur in nine consecutive days), produces relatively regular, progressive decrease in the average rate of the heart-beat. This agrees with the observations of previous investigators, but the periods concerned are longer than those hitherto studied.

M. Bourdon's article is in large measure given over to a presentation of the difficulties involved in his problem of measuring the intensity of the voice. Apparatus is described for determining the force of the breath, both from the nose and the mouth, the vibrations of the walls of the throat and the movement of the lips. A table shows the results, measured by tambour tracings on a smoked drum, of combining each of the consonants with the eleven chief vowel sounds in French. Both methods and results are apparently still in the pioneer stage, and the latter do not as yet lend themselves to any very sweeping generalizations.

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Studies from the Yale Psychological Laboratory. Edited by E. W. SCRIPTURE. Yale University, New Haven, Conn. 1898. Vol. V. Pp. 105.

The major portion of the present number of the Yale Studies is devoted to acoustic space. Mr. Matsumoto publishes his thesis on this subject presented to the University of Tokyo for the doctorate. The value of the paper lies not so much in the presentation of new facts, as in the systematic and thorough treatment of the various factors involved.

The apparatus employed in most of the experiments consisted of a spherical cage in which the subject was seated and upon which telephones or small metallic hammers could be adjusted at certain points. In part of the tests a cloth chamber was substituted for the cage, in order to eliminate the effects of reflected sound. When desired, two sounds could be given simultaneously from different directions and with like or different intensities.

Like other observers, Mr. Matsumoto finds that the localization of sound depends on the difference between the sensations arising from the two ears. A sound is localized on the side of the ear from which the most intense sensation is received. When both ears are stimu-

lated with equal intensity the sound is localized in the median plane. The great uncertainty attaching to the localization as front or back in this plane is lessened by anything tending to afford differentiation for sounds from the two directions: *e. g.*, diminished intensity or modification of overtones of sounds from the rear, owing to the effects of the pinnæ and the conformation of the external meatus. Two sounds at different levels will, if of equal intensity, be localized at a point midway between the two. When two such sounds move from a common starting-point in different directions, the localizations will take a direction representing the resultant of the two movements. The confusion of front and back leads to occasional exceptions to this rule. Judgments of distance apparently conform to the relations involved in Weber's law, *i. e.*, geometrical increase of sound intensity is accompanied by arithmetical decrease of estimated distance.[1] The judgment of distance thus depends upon absolute sound intensity, whereas direction depends upon the relative intensity of the component factors from the two ears. The discrimination for change in the direction of sound is most delicate when the point of departure is in the median plane and the movement is away from this.

The concluding part of the paper is devoted to a very brief critical review of typical theories of acoustic space. The author adopts what he calls a motor theory, in accordance with which acoustic space seems to resolve itself into a series of motor impulses flowing from auditory stimulations. These impulses develop according to the general laws of association and natural selection. Space is primarily visual, tactual and motor. The connection of this theoretical matter with the experimental observations is the least successful portion of the thesis, which gives evidence of a deal of painstaking labor. It is to be hoped that Mr. Matsumoto will publish a fuller account of the introspective observations of his subjects, and also some statement of the method by which the localizations were indicated, *e. g.*, whether by pointing, and the errors thus involved.

Dr. Scripture, in a brief article on binaural space, proposes a formula for the general expression of the dependence of the localization of a sound upon the intensities of the respective components from the two ears. He supposes (1) that "the distance right or left of the median plane is proportional to the difference between the intensities of the two components, *i. e.*, $x = cd$, when c is the factor of proportionality" and d the difference in intensity between the right and left

[1] A similar relation between intensity of light and judgments of distance has just been observed. Cf. Ashley, PSYCHOLOGICAL REVIEW, 1898.

components; (2) * * * "the relation between the distance from the median plane and the distance from the auditory axis is expressed by $y = me - \frac{x^3}{am}$, where m is the distance of the sound when $x = o$ (*i. e.*, $d = o$) and a is a proportionality factor." A complete expression must provide for reference to a system of coördinates in which the three principal planes of the body shall be represented, *e. g.*, X, Y, Z, so that a localization in any direction may be accounted for. Then $x = cd$, $y = me - \frac{x^3}{am}$. sin a, $z = me - \frac{x^3}{am}$. cos a. A series of curves plotted in accordance with these expressions agree with Mr. Matsumoto's observations, which do not, however, furnish a perfect demonstration because of the lack of accurate measurements for the intensities of sound employed.

Dr. Scripture also reprints from *Science* (1897) his note on 'cerebral light,' maintaining from several observations that the so-called 'retinal light' is of cortical origin. The field for such light is single, not double; the figures do not move when the position of the eyes is changed, whether by ordinary rotation or by actual displacement under pressure. The appearance of visual memory images with these figures leads the author to ascribe their origin to some of the higher brain centers.

W. C. Cooke and C. M. Warren join with Dr. Scripture in a very brief report of some tests upon the memory for arm movements. They find the constant error as related to the elapsed interval variable for different individuals, for different absolute distances and for different modes of experimentation.

Dr. Scripture contributes a longer article upon the principles of laboratory economy, which contains a number of ingenious and useful suggestions upon the arrangement of laboratory and lecture rooms and upon general equipment. He also expresses his views as to the organization of psychological work in the university and the ideals which should be kept in view. Laboratory instruction, as distinct from research work, he would employ simply for developing the powers of observation and technical facility, reserving for lecture courses the conveying of the facts of psychology. The whole article reflects Dr. Scripture's well-known tendency to emphasize strongly the mechanical, physical and mathematical sides of experimental psychology, and it is no doubt well that we should have among us so able a prophet of technique. The following sentence deserves to be quoted in this connection [p. 95]: * * * * "If the other depart-

ments, such as physics, can show better, brighter and more numerous pieces of apparatus, the students are apt to draw disparaging conclusions. The students are no longer a 'class' to be taught; they are an audience that must be led." This is not the place to discuss the merits of Dr. Scripture's attitude upon this question. It may, however, be safely asserted that many of his colleagues will feel that, with all which is admirable in his own work and the work of his students, there is constant danger, not always successfully avoided, of missing the forest for the trees.

The size-weight illusion among the blind is the subject of a brief report by J. A. Rice. The illusion is found to obtain among the blind, and follows the same general laws as among the seeing, but for touch and the muscle sense it is less marked than with normal persons. A few notes offering blue-prints of Yale apparatus, explaining the Yale color-tester and correcting misprints in the previous volume of studies, conclude the number.

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Subconscious Homicide and Suicide; their Physiological Psychology. CHARLES P. BANCROFT. Am. Jnl. Insanity, Vol. LV., No. 2, pp. 263–273.

Dr. Bancroft, Superintendent of the New Hampshire Asylum at Concord, in this interesting though brief paper (read before the American Medico-Psychologic Association in St. Louis, May, 1898), has touched upon timely topics of interest both to medical jurisprudence and to psychology. It offers theoretical explanations illustrated by two similar cases, one attempted suicide and the other homicide, both committed in what the writer considers a condition of split-off consciousness, induced most likely by mild toxic agencies, and accompanied or followed by amnesia.

The writer recognizes the importance to psychiatry of admitting the practical parallelism postulated to exist between consciousness and neural function. It is suggested that the physiological neural dissociation, which the work of Dr. Sidis has shown to be present in hypnosis, may obtain at other times, as in these two instances, through the agency of poisons, and, disintegrating the sum of tendencies of which a personality is composed, cause just such an aberration of the real purpose of the self as suicide and homicide often present. He considers that the action is conducted on precisely the principle of reflex action, the normal inhibitory faculties of the indi-

vidual being then in abeyance, like his judgment. In short, Dr. Bancroft aptly concludes, the organism has then for the time become an automaton, uncontrolled, and actuated by suggestions more or less subconsciously received in normal hours.

GEORGE V. DEARBORN.

On the Measurement of Mental Activity through Muscular Activity and the Determination of a Constant of Attention. JEANNETTE C. WELCH. Am. Jnl. of Physiology, Vol. I., No. 3, May, 1898, pp. 263–306.

This is an article, timely and concise, describing work done in the Hull Physiological Laboratory of the University of Chicago. It is a 'continuation' of a research reported by Professor Loeb in a preliminary communication published in 1886 ('Muskelthätigkeiten als Maass Psychischer Thätigkeit,' 'Arch. f. d. ges. Physiol.,' XXXIX., p. 592). An important part of the report is that wherein the dynamograph of Loeb, with which the work was done, is illustrated and described. This piece of apparatus will doubtless become common in psychological laboratories, it having some advantages over those now generally in use. It consists of an axle to which is attached below a short flat bar of spring-steel, which when in use impinges against an iron wedge, adjustable in position by a screw. To the upper side of the axle is attached a rod connected to the handle in which the subject's fingers are placed, while the palm of the hand gets its purchase from a small iron post. From the upper portion of the axle's surface a writing lever projects to the surface of a kymograph record-drum.

Miss Welch found that, when various sorts of mental activity were practiced simultaneously with the static maximum contraction of the hand, the physical force decreased in proportion to the attention required upon the mental efforts. The mental work was various in kind, and comprised such exertions as counting the conflicting rhythms of pendulums, strained visual perception, reading, writing, adding, multiplying, etc. By measuring the ordinates and abscissas of the curves traced by the dynamograph the 'constant of attention' was determined in each case, and this afforded the means for determining the concentration of attention required in the various sets of experiments. This constant of attention was found according to the formula $\frac{P-p}{P}$. In this P represents the maximum pressure of the dynamograph, *i. e.*, its records when the attention was wholly upon the muscular work; p represents the maximum of the muscular effort with concomitant mental work.

The determination of this constant was found to be no easy task, but in case of some subjects quite satisfactory results were obtained. The attention-constant in tne case of one subject was found to range from 0.22 during the 'registration of the vibration of a pendulum by pressing one tube, the perception being visual,' to 0.585 obtained as a mean while 'counting the register of the fifth vibration of a metronome and the second vibration of a pendulum'—the most difficult of the mental tasks imposed.

It was found that the constant of attention for any activity increases with (1) the effort of accommodation of the special sense-organs; (2) the effort in coördination of the muscles; (3) the effort of the memory, and (4) the number of simultaneous 'activities.' It seems likely to the experimenter that all control of the body depends upon inhibition-impulses. "After a certain amount of practice," says Miss Welch, "and with care to have like conditions in every case, I believe that the mean constant of attention for any mental activity can be determined for every subject with as slight variation as the personal equation in time-reaction."

GEORGE V. DEARBORN.

The Reinforcement of Voluntary Muscular Contractions. ALLEN CLEGHORN, M.D. Am. Jnl. Physiology, Vol. I., No. 3, May, 1898, pp. 336–345.

This is a report of a research conducted in the Harvard Physiological Laboratory to determine what effect sensory stimuli have upon voluntary muscular movements. The stimuli employed were light (from a 32 c.p. glow-lamp), a sudden sound (hammer falling on a tin disk), and induction shocks on the skin (of the arm). These were applied by electrical mechanism at the instigation of the movements studied. A Mosso's ergograph was employed, the resistance being two kilograms.

It was found that a sensory stimulus applied just as the muscles began to contract caused an increase in the recorded contraction, as other experimenters have reported. On the other hand, the relaxation phase of the phenomenon is shortened by a sensory stimulus applied at the beginning of the contraction.

The substance of the experimental portion of this report may be given briefly thus: The average duration in seconds of a voluntary muscular *contraction* with simultaneous sensory stimulation is with light 0.49; with sound 0.47; and with induction shock 0.44, in contrast to 0.51, 0.43 and 0.38, respectively, without sensory stimulation.

The average duration of the *relaxation* is with light 0.29; with sound 0.29; and with induction shock 0.33, as compared with 0.61, 0.49 and 0.51 in cases without stimulus—a decided and constant decrease in the time.

As to the causes of these phenomena, Dr. Cleghorn suggests that the "acceleration of the relaxation is not due to augmentation of the contraction of the antagonistic muscles, for the relaxation of the extensors does not visibly differ in rapidity and extent from the relaxation of the flexors." And, again, "the acceleration of the relaxation cannot be ascribed to the sensory stimulus inhibiting the discharge of motor neurons and thus permitting the rapid passive extension of the muscles by the load of the ergograph, for the acceleration does not increase with an increase of the load." The experimenter concludes that in the present state of knowledge the acceleration is best explained as "an augmentation of an active relaxation-process by sensory stimuli."

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Inhibition. H. S. CURTIS. Pedagogical Seminary, Vol. VI., No. 1, October, 1898.

The author does not explain why, in his 'summary of the chief theories and facts of inhibition,' with which he introduces the paper, he confines himself to the psychologies of Herbart, Beneke, Taine and Roux. Are these the only psychologists that have contributed anything of value on inhibition?

Four pages are given to Wundt's *Mechanik der Nerven* and the physiology of the vagus nerve. Section II. is a discussion of the effect of one activity upon another: Excessive mental work may diminish the strength of the muscles and otherwise interfere with physiological function. On the other hand, hard and long-continued physical labor may be the cause of mental stupidity. One activity may inhibit another, (1) by its waste material, (2) by decreasing the blood supply, (3) by absorbing nutrition directly from resting tissue, and (4) by draining energy from other brain areas.

The higher areas are connected with the motor areas by associational fibers, which are at first more or less impermeable. If mental activity has lowered the energy in one of the higher centers, the energy of other centers tends to press in upon the area of low pressure, and by overcoming the resistance make permeable inter-connecting paths. Education has to do with the formation of these paths whereby one area may use the energy of others.

The explanation of restlessness in children is found in the theory hat the lower brain areas of the child have not yet developed paths to the 'rational or associational' areas. The energy of the motor centers has no chance to drain off into the higher centers, consequently it discharges into the motor nerves. By means of pedometer records taken from 34 persons of various ages, the writer finds that country children are more active than city children, and that activity is greatest below six years of age. It reaches its maximum on Saturday. Monday and Tuesday are days of high activity, but on Wednesday, Thursday and Friday it falls off abruptly and makes the minimum on Sunday. By the questionnaire method an attempt is made to get some data on such topics as 'Sitting Still,' 'Restlessness in Sleep,' the physical and mental characteristics of the 'Restless' and the 'Quiet Child,' 'Sickness in its relation to activity' and 'Excitement.' The results are of little value.

The author closes with a section which he calls 'Pedagogical Inferences.' He thinks that, since the motor areas are to furnish so much energy for intellectual activities, "physical health and development must be the first interest of education." This section contains much irrelevant matter.

A serious defect in the whole paper is that the theory, unprofitable in itself, is unsupported by facts. What few experiments are given are wholly unrelated to the theoretical part.

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FATIGUE.

1. *Arbeitshygiene der Schule auf Grund von Ermüdungsmessen.* F. KEMSIES. Berlin, Reuther und Reichard. 1898.
2. *Unterricht und Ermüdung.* L. WAGNER. Berlin, Reuther und Reichard. 1898.
3. *Zur Ueberbürdungsfrage.* DR. KRAEPELIN. Jena, Fischer. 1898.

Since Professor Mosso's work appeared, half a dozen years ago (Die Ermüdung, Leipzig, 1892), a mass of German monographs upon the phenomena of fatigue have accumulated. Most of these bear directly upon the practical question of school work and its exhaustive effect upon children, yet the work has been done chiefly by physiologists, psychologists and alienists. After Mosso the names of Griesbach in Mühlhausen, Ebbinghaus in Breslau, Burgerstein in Vienna, Kraepelin in Heidelberg, and Schulze in Leipzig are most

familiar to us as investigators along these lines. Little has been done by practical school-teachers, who, with directors and school boards, are in the end the persons to be reached if such experiments are to have effect in the abolition of unhygienic conditions and reform in methods of work.

Scientific interest in such matters has now spread to the school-room, and busy masters make time for long series of observations upon the pupils under their charge. During the past year two numbers of Schiller and Ziehen's *Abhandlungen aus dem Gebiete der Pädagogischen Psychologie* have been given up to reports of such studies; the one (*supra* No. 1) consisting of observations on pupils of the third year in a Berlin grammar school, the other (*supra* No. 2), of observations on the scholars in the gymnasium at Darmstadt. Next spring it is proposed to unite the scattered investigators of Germany into an association for the study of children, in the work of which the problems of fatigue will assume an important place. The next years, therefore, are likely to see appreciable advances in our application of the principles of hygiene to school work. Of the above-mentioned brochures I have shortly to speak, together with the recent work of Dr. Kraepelin, professor of psychiatry at Heidelberg (*supra* No. 3), which is one of the most discerning and suggestive among contributions to the study of fatigue in the school-room.

A sharp distinction must be drawn between objective and subjective exhaustion, between fatigue (Ermüdung) and weariness (Müdigkeit). The one is a constant factor and corresponds to the amount of work done; the other is fluctuating and depends upon the degree of interest in the work. Weariness is a superficial fact of attention, which may appear, disappear and reappear many times in a day; fatigue is a deep-seated phenomenon of nervous exhaustion, which steadily increases with continuance of work, and its results cannot be averted, though they may be obscured. Weariness can be induced in a fresh subject by dull work, monotony, stale familiarity, while the capacity for work, as expressed in the ergographic record, or by refinement of skin sensibility, continues unabated. Change the topic of study, substitute another teacher, adopt a picturesque method, and the pupil's weariness vanishes. No such easy recovery from fatigue is possible; it can be removed only by rest, food, sleep, and light exercise in the open air. Weariness may abate as fatigue increases; the subject frequently appears fresher at the end of a piece of work than in the middle, and his zest of accomplishment is manifested in a reduction in the fatigue curve itself. But that it is not a permanent refreshment

is shown by the rapid and extensive increase in fatigue subsequent to the completion of the work. Fatigue means a reduction in the total effective force of the individual, which can be discriminated and measured; weariness is a fluctuating personal attitude which is scarcely susceptible of record in any form. In the study of fatigue, therefore, we have to seek for the phenomena of actual reduction in capacity for productive work; and from its effects we must discriminate the factors of interest and weariness.

This makes the question of method an important one. The phenomenon to be measured is the reduction in central nervous tonicity which marks successive periods of school work. There is no practical way of observing this directly; indirect forms of measurement must, therefore, be resorted to. These fall into two general groups, depending upon the different ways in which central nervous activity is expressed: first, *mental*, in fixation of the attention, with its complications in memory, judgment and the like; and second, *physical*, in muscular innervation. The physical method of measuring fatigue was adopted by the pioneer in the study, Professor Mosso, whose records were taken in the form of dynamometric tracings of the ergograph. This test, while it is open to the objection that it involves too cumbrous apparatus for wide use, yet continues to be one of the most reliable methods which have yet been devised.

The mental test, on the other hand, has been extensively applied. It is Kraepelin's method and the method of Burgerstein, Haser, Kemsies and many others. The form may vary widely: firstly, in the character of the work required, which may be either a long series of simple examples (v. Laser, Holmes, Richter), or a few pieces of more difficult work (v. Sikorsky, Friedrich, Kemsies); and secondly, in the method of measuring fatigue, which may be either by the decrease in the rapidity with which the work is done or by the increase in the number of errors which occur. A test which has been called the *combination method* was devised by Ebbinghaus, who used paragraphs of text from which here and there words had been erased. The subjects were required to fill in all the blanks, within a given time, with words which made sense with the context. Measurement was by the number of errors occurring. The apparatus for all such mental tests is simple; it requires only the preparation of a set of arithmetical problems or the mutilating of a printed page. Its method of reading results is likewise easy, since it consists in a mere counting and averaging of errors. The truth of its interpretations is, however, by no means so certain. The test does not get at the phenomenon to be

studied at all directly or unequivocably, unless the distinction between fatigue and weariness is to be overlooked altogether. The material from which the results are read is the product of the total set of mental conditions obtaining at the time of the investigation, and the number of errors in any given case will as readily be affected by a feeling of rivalry between the pupils or by a momentary distraction as by the influence of fatigue itself. These influences cannot unconditionally be set down as constant factors, which are, therefore, eliminable. The anticipation of recess or the conclusion of work may very well be potent in establishing a law of rhythmical increase and decrease in the number of errors, which will well combine with the actual exhaustion effects to produce a curve which does not at all truly represent the rise in fatigue. The results of practice, likewise, interfere with the purity of the fatigue curve when it is determined by the number of errors occurring.

In view of such sources of error in the purely mental test Griesbach has employed an æsthesiometer to determine the amount of fatigue, a method which has been adopted by Wagner throughout his experiments in the Darmstadt schools. An area was selected upon the cheek and jaw of which the normal discrimination distance for two touch impressions was taken before school work began. The amount of fatigue was measured by the decline in discriminative acuteness which appeared after each successive hour of school work. This form of test has apparently proved decidedly satisfactory; it unites the simplicity of a physical method with a direct psychological fatigue factor.

I shall speak of the results of the various investigations in common. The best work of the school day is done in the first two hours; the last two are the most unfavorable. Within the first two hours the majority of pupils reach their maximum; only on Monday do the third and fourth hours show better work. If work of equal quality is to be obtained during these last two hours it must be done more slowly. For children under twelve years the school day should not exceed four hours; from twelve to sixteen a maximum of five may be imposed.

The best work of the school week is done on Monday and Tuesday; the worst is met with on Saturday; the intervening days show a fairly steady decline from maximum to minimum. After every holiday a return to the initial freshness of Monday occurs. There is no significant increase of fatigue during the course of the school term, apart from the increase of pressure toward its close. There appears thus an incomplete recovery as the week progresses, from the strain of

the preceding day, a grave item to be considered in the arrangement of school curricula.

The employment of any given hour in work which taxes the pupil heavily is marked by a falling off in quality of work during the hour succeeding it. This holds true in spite of change of work, which is designed to relieve the pupil by calling new powers into play. Change of work is held to be rest; but the fatigue persists, no matter what the new subject of study may be. Change of work is recreation only when the new occupation calls into activity a fresh set of powers, that is, only in so far as it is *rest*. Such a method may easily be applied to obtain relief from physical labor; it is to be doubted if it can be successfully employed as a means of release from mental strain. The facts cited point to the conclusion that mental work of every kind is accompanied by general and not localized central fatigue, and it is questionable if new faculties can be appealed to. The fact of clearly defined fatigue, upon which Wagner lays especial stress, bears directly against such a conclusion. All mental work involves fatigue of all and every part of the pupil's faculties, and there appears no absolute escape from it by variation of studies. Only rest will reach it, and to this end both Wagner and Kemsies recommend the introduction of ten-minute pauses at the conclusion of each hour's work.

Four types of subject are to be discriminated: (I.) What may be called the normal, marked by a relatively brief rise in efficiency attributable to elimination of initial distraction, which is followed by a continuing depression, the curve falling away steadily through increasing fatigue. In this type a second maximum sometimes occurs towards the close of the forenoon's work.

(II.) In this type there is an initial maximum from which the curve falls away rapidly and continuously throughout the day. Such children are of weak resistance and must be carefully considered with reference to the problem of fatigue. They have little elasticity, and rest is absolutely necessary to effective work.

(III.) The third type is characterized by a depression, often excessive, in the middle of the school period, the curve declining sharply from the beginning till mid-forenoon, and there rising toward a secondary maximum during the following period. This type resembles the preceding in its low resistance, but differs from it in its elasticity. The recess almost restores its initial tonicity. Easily fatigued, it readily recovers from depression, and the problem of fatigue is here less grave than with those in whom the depression, more slowly manifested, is much more permanent. In this type the second maximum

is usually reached before the close of a four-hour school session, and the last working period is marked by a rapid increase of fatigue.

(IV.) This type, which Dr. Wagner calls the neuropathic group, is marked by a uniform initial depression, from which the curve of efficiency rises irregularly and rather slowly towards a maximum, which in most cases is reached before the close of the forenoon's work. In all four types the maximum is followed by a rapid increase in fatigue, which reaches its extreme form in the neuropathic group. Here the breaking strain comes swiftly, and if work be continued for any length of time after the reaction sets in it is liable to issue in sudden extreme exhaustion. This type is deceptive and needs the closest care.

The relation of individual studies to the problem of fatigue is of minor importance. Every discipline in turn may be made refreshing or fatiguing. The personality of the teacher counts for immensely more than the nature of the material. Nevertheless, considered in themselves a scale of values may be made out. Mathematics and Classics stand high in all the lists; singing, drawing and religion come far down, as does also the study of German. That is, studies which demand close application tax the pupil heavily, while those in which practice and mechanical routine can play a part are marked by slight fatigue. Gymnastic exercise, instead of being recuperative, ranks among the most fatiguing forms of school work. Only light exercise is recreation. Even the recess period is marked by deep fatigue in those who indulge in violent exercise. Instead of the customary intervention, the various investigators agree in recommending a shorter pause after each hour's work, during which noisy games shall be discouraged and the children taught to seek rest, fresh air and gentle movement. In these lies the solution of the problem of fatigue in school.

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TIME-SENSE.

Zur Psychologie der Zeitanschauung. F. SCHUMANN. Zeitsch. f. Psych. und Phys. d. Sinnesorgane, Vol. XVII., pp. 106–148.

Zur Schätzung leerer, von einfachen Schalleindrücken begreuzter Zeiten. F. SCHUMANN. Zeitsch. f. Psych. und Phys. d. Sinnesorgane, Vol. XVIII., pp. 1–48.

The first article opens with six pages of quotation from Professor G. E. Müller's dictata on time-perception. A brief review of the general theory there announced is as follows: All sensation qualities

are capable of certain modifications. For example, a given tonal quality may undergo modifications in intensity and in clang-color. Some of these modifications are of such a character that they cannot appear at the same time in the same quality: for example, a high and a low intensity. The result is that we form a complex idea of the quality, which contains a series of possible modifications in intensity. In the case of a second quality we form a similar complex idea, which also contains a series of modifications in intensity which are the same as those in the first case. We come in this way to isolate the notion of intensity. It is in reality only a kind of modification of sensation quality; it is not independent in the mind. Time is analogous to intensity. The difference is that in the case of time we must deal not with a single sensation, but with a complex idea including two or more sensations, and we have in this case not a uniform mode of modification, but a uniform relation between qualities. The relation may be recognized because more than one set of qualities appear in the same relation. But the knowledge of temporal changes is not the result of a special relating activity which is outside of the ideas themselves. The whole group of sensations is held together by the mind in a certain relation, and this relation is essential to the formation of the idea. Its recognition is due to its recurrence with different groups of qualities.

This general theory of Müller's, Schumann attempts to elaborate and defend. First, time is not a special content distinct from the sensation factors. In general, the discovery of differences between simple ideas, as, for example, the difference between two shades of gray, is not due to a separate content corresponding to the difference. The whole process is made up of two sensations and the immediately resulting judgment of difference. Introspection reveals nothing further. Even the assumption of a comparing activity finds no justification through introspection. The comparing activity is not something different from the joint apprehension. In cases where the difference is difficult to perceive and conscious effort is present, the apparent comparison is merely a higher degree of attention, unless, indeed, the mind makes use of secondary aids in the formation of the judgment.

Secondly, there is no need of assuming that for the formation of a temporal judgment both sensational elements must be simultaneously present in consciousness. Of course, the first impression must leave its trace, but this is not a conscious idea; it is much rather to be thought of as a physiological trace. There is no other possibility of immediate perception of duration, for if we require a conscious comparison then the judgment becomes mediate. Thirdly, the psychical present is never

a point; it is a line, and as a psychical process must be regarded as a complex of greater or less duration.

The assumption of a form-quality or of a form-feeling is opposed, on the ground that introspection shows no such factors and it is not required. The remainder of this article and the whole of the second are devoted to a defense of the author's earlier results and explanations against the attacks of other investigators, particularly Meumann.

Estimation of intervals depends on the secondary data of expectation and surprise which arise when the given interval does not correspond to that for which attention is 'set.' This position is supported by introspection, by the phenomena of contact, the underestimation of intervals observed with lax attention, the overestimation of intervals following a pause, and the parallelism between the rise and fall of expectation and bodily movements.

It has been reported that when the last of three stimuli marking off two equal intervals of time is intensified the second interval is overestimated. Now, the intensification of a stimulus results in surprise, and this should, according to Schumann's principle, have just the opposite effect to that reported. In answer, the author reports experiments in which he shows that the common, simple result is underestimation rather than overestimation. In the cases where the intensification led to a conscious introduction of rhythm the result was overestimation. The normal results are in agreement with the theory; the rhythmical complications explain the others.

The constant errors of judgment at intervals of different lengths are not fundamental facts, but are all to be explained by one or more of a variety of influences, such as contrast with previously given intervals, accompanying sensations of strain, rhythmical apprehension, and possibly others.

Meumann finds that, in a long series, sounds heard at a given rate seem more rapid than only two or three sounds at the same rate. Schumann finds that in all cases where this error in judgment appears it is based on a relaxing of the attention during the longer series. Finally, in regard to Meumann's results that a series of strong sounds which succeed each other at short intervals seems more rapid than a series of weaker sounds given at the same rate, Schumann finds that his subjects either perceive no difference at all or else observe the exact opposite of that reported by Meumann. The contradiction may be due to subjective conditions or to the objective conditions under which the experiments were tried.

The investigations of time-perception are among the most difficult

undertaken in experimental psychology. If one overlooks the earlier, rather crude experiments, the number of valuable treatments of this subject reduces to five or six. Unfortunately, the results thus far obtained are frequently of such a conflicting character that one feels that the whole ground must be gone over anew before any interpretation can be commenced. The articles have come to take on a polemical and too often personal character that does not tend to stimulate unqualified acceptance of the statements of either party. The personal equation doubtless plays a very large part in estimation of time intervals, and perhaps it would be well for investigators to recognize this fact once for all, and not to be too hasty in generalizing from their own individual observations or from those of their own 'school.'

The theories, too, are hypothetical in the last degree, and must be so regarded. It seems clear to the present reviewer that both space and time must ultimately be explained as recognitions of relations and not as contents. It is difficult, however, to give such a theory an intelligible statement, and the difficulty of finding a psychical process in which a relation is apprehended is always difficult. This latter difficulty can certainly not be disposed of by calling it an 'immediate' process or by referring it to some undefined physiological traces. The close relation between the unanalyzed processes of immediate perception and the more complex processes of mediate judgment furnishes perhaps a clue that will aid in the solution. The simpler process must be like the more complex in kind, if not in degree.

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Zwei Beiträge zur Psychologie des Rhythmus und des Tempo. KURT EBHARDT. Zeitsch. für Psych. und Phys. der Sinnesorgane, Bd. XVIII., Hf. 2.

The general result of this investigation may be briefly summarized in the following principle: Whenever a subject who is producing a series of sounds by means of movements of the hand is required to increase in any way the effort necessary to produce the proper movement, his attention will be in part absorbed by the increase in effort and he will not perceive fully the lapse of time. The result will be that he will judge to be equal intervals which are in reality different—longer intervals with greater effort being judged as equal to shorter intervals with less effort.

In the first group of experiments the subject produced series of

movements at regular intervals. The interval was left to the subject's choice and varied between 0.3 and 0.6 of a second. In a first series all the movements were of equal intensity. In a second series every second movement, in a third, every third movement, was emphasized. The result was that all intervals following accented movements were longer than those following unaccented movements.

In the second group of experiments it was found that a musical composition played without its full accompaniment required more time than one played with the accompaniment. Or a piece of music executed on a set of keys not connected with strings, and thus producing no sounds, required more time than one executed on the ordinary instrument. In both of these cases the subject is forced to supply the part omitted by an increased effort of imagination. This increased effort absorbs the attention and causes him to underestimate the duration. Ebhardt holds that in all these cases we have to do with phenomena of activity and with the sensations most directly associated with activity rather than with the more passively received sensations. But even from this point of view it is not easy to see how greater concentration of attention on the sensations is to obscure the duration. The duration can not be regarded as a separate content which can be pushed out of consciousness by strong sensations of movement. Duration is an attribute of sensations or complexes of sensations. That concentration on these sensations is to obscure their temporal attributes certainly requires some explanation rather than mere dogmatic assertion.

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VISION.

S. Ramon y Cajal's Neuere Beiträge zur Histologie der Retina. R. GREEF. Ztsch. f. Psych. u. Physiol. der Sinnesorgane, Vol. XVI., 1898, pp. 161–187.

Dr. Greef gives an interesting summary of the most recent additions made by Ramon y Cajal to our knowledge of the structure of the retina; the subject, up to the stage of its development here described, has been made most accessible to the non-specialist reader in *Die Retina der Wirbelthiere* (Wiesbaden, 1894) by Dr. Greef, who has also made contributions of his own to the work of the Spanish author. The most interesting points now made out (which may be added, for the English reader, to the excellent account in the *System of Diseases of the Eye*, by Norris and Oliver) are the following:

Most important of all, it can now be affirmed, without doubt, that the cones are, quite simply, rods in a higher stage of development. This fact is very much to the favor of those theories of the light sense which regard the color function of the cones as a developed form of the rod function, the latter affording no means of discriminating between lights of different periodicity. That the cones are intrusted with the conveyance of some more complicated form of excitation (whatever the nature of the excitation may be) is indicated by the fact that the knob-like basilar ending of the rods is replaced in them by numerous thread-like expansions. If our subjectively acquired belief regarding the different functions of the rods and cones had happened to be the reverse of what it is (if we had been induced to attribute the color sense to the rods and the undiscriminated light sense to the cones), knowledge on this subject would now be at a standing-still point of contradiction; as it is, it can go on its way rejoicing in one more of those mutual confirmations of reasoning processes proceeding by different routes which are, in general, the source of the confidence we feel in our interpretation of the phenomena of the natural world. Even the latest writers on the histogenesis of the retina have had little to say on the early stages of the infra-limitant portion of the rods and cones. It has only now been made out, by the Golgi method, and especially by means of the double impregnation and the rolling-up of the retina, that the rods and cones pass through a period (in the newborn cat, for instance) when they exhibit no difference in structure (so far as structure is preserved in these methods), and can only be distinguished from each other by the circumstance that the nucleus of one is surrounded by a somewhat thicker layer of protoplasm than that of the others, and so stains darker. (This is a stage in which the end members are wholly undeveloped, and so can give no means of orientation.) The question of their embryonal identity—a question which Cajal himself was formerly obliged to give up—he has now, therefore, been able to solve in the affirmative sense.

Other points which may be noticed in this summary of results are these: There have been many reasons for regarding the rods and cones as differentiated epithelial cells and not as nerve cells or as neuroglia cells—the epithelioid appearance of their outer members, their position as limiting cells in the interior of the primitive optic cup, etc. That they are, in fact, such is now established by the circumstance that in their development they pass through, like nerve cells, a monopolar phase, but that, unlike the neuroblasts of His, the cellulipetal process is first developed, and not the cellulifugal. If

R. y Cajal is right, we have now a criterion by which to distinguish between the three classes of cells which are capable of conducting nervous currents: (1) cells in which the cellulipetal process is formed first (rods and cones, taste-cells, etc.); (2) those which begin their development with the sending-out of a cellulifugal process (the great majority of the multipolar cells of the nervous centers); (3) cells which seem to form both processes at the same time (bipolar cells of the retina, of Corti's organ, etc.). The difference between the bipolar cells intended for the rods and those intended for the cones is much greater in mammals the fourth day after birth than it is later, which confirms Cajal's discovery that these cells are distinctly different.—Recent studies of the retina of the sparrow (in which this organ has reached an extremely high development) disclose a new form of cell (later detected also in the retinæ of reptiles and of some mammals) which resembles both in shape and in position the amacrine cells, but which differs from them in having an immensely long (sometimes a millimeter long) axis-cylinder process. Their function seems to be to act as association-fibres between distant amacrine cells. They are extremely numerous, and it is very probable that the ramifications of the centrifugal nervous fibres are spread out around these cells. They may be called the amacrine-association cells.—The retinæ of birds offer the best field for the study of the centrifugal fibres; for the finch, sparrow, etc., the Golgi method is best; for the thicker retina of the dove, that of Ehrlich. Cajal is now thoroughly convinced that these fibres all terminate in close contiguity with amacrine cells, and that the function of the latter is to form an important member in a conducting chain between the brain and the junction of the bipolar with the ganglion cells.—Among the regular cells of the ganglion layer are certain others which are now made out to be true amacrine cells, but not in their proper place—dislocated amacrine cells. R. y Cajal has before laid down the rule that for the recognition of the nature of a nervous cell one should not attend so much to the position of the cell-body, for that may vary greatly, but rather to the position and the relations of the protoplasmic processes and the axis-cylinder. By means of this principle Lénhossek has been able to discover the bipolar cells of Cephalopods, although they are on top of, instead of beneath the feet of, the rods and cones, and also their amacrine cells, although the bodies of these cells are quite out of their natural position.—It is more than ever certain that there are nowhere in the retina either nervous reticulations or protoplasmic anastomoses.

C. Ladd Franklin.

Ueber Raumwahrnehmung beim monocularen Sehen. ROBERT MÜLLER. Philosophische Studien, Vol. XIV., No. 3, pp. 402–470.

This is another investigation of monocular depth-perception by Hering's method of dropping marbles through the field of vision. Only indirect vision was investigated, the aim being to find whether empirical evidence could be educed in support of Kirschmann's theory of the importance of parallax in indirect vision. The results are held to indicate the presence of a means of judging vaguely monocular depth, even when movements are excluded. The absolute localization is attributed to binocular factors that can never be eliminated.

Like all investigations by this method, the results require a good deal of interpreting before the conclusion can be put in its accepted form. Interpretation and historical review make up the main part of the article.

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Die stroboskopischen Erscheinungen. KARL MARBE. Philosophische Studien, Vol. XIV., No. 3, pp. 376–401.

The article opens with a summary of all the references to stroboscopic phenomena and a criticism of the results thus reviewed. Then follows a restatement of Talbot's law on which it is held that these phenomena depend. The only part of this section that is particularly new is the description of an experiment suggested by the work of Grünbaum in the *Journal of Physiology*, to show that the slower the contours of surfaces which are to fuse, vary, the less will be the fusion at a given slow rate of movement. A mirror is covered with black paper in which there are two small openings. These openings are so arranged that in one there will be seen the reflection of the periphery of a rotating disk made of white and black sectors. The other opening reflects a part of the same disk nearer the center. If the rotation is just fast enough to produce fusion at the periphery, there will not be fusion at the center.

The apparent movement of stroboscopic figures is due to a failure of the subject to detect the omitted phases of the movement. These omitted phases may be brought out by especially arranged conditions. Such apparent movement is accordingly due to a central process.

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GENERAL.

The Origin and Growth of the Moral Instinct. ALEXANDER SUTHERLAND, M.A. London and New York, Longmans. 1898. 2 vols. Pp. xiii + 797.

These two handsome volumes are well worth reading. The language of the author is lucid and non-technical. His thought is simply presented, although it has involved many years of thought and labor. The author claims full half of the book to be a detailed expansion of the fourth and fifth chapters of Darwin's Descent of Man. The whole work, however, is independent in its thought and execution.

Adam Smith and Darwin are the godfathers of the present child. Adam Smith, it is claimed, needed only a suspicion of what Darwin established to have revealed the true origin of our 'moral instincts.' He founded morality on sympathy, but knew not whence the sympathy arose.

Mr. Sutherland's position may be summed up somewhat as follows: The 'moral instinct' is of an emotional nature. Intelligence is a concomitant. A moral action is one which is founded on sympathy. While philosophers, as Schiller says, are disputing about the government of the world, Hunger and Love are performing the task. These two great masses of reactions and tendencies, in the form of self-preservation, selfishness, ambition, will-power, etc., on the one hand, and sympathy, generosity, altruism, love, etc., on the other, are present as potentialities in each human being. The latter sum of tendencies Mr. Sutherland calls moral. In a far more inductive and thorough spirit than that of Herbert Spencer or Drummond, he traces the growth of the sympathetic or altruistic feelings, showing how absolutely necessary they are biologically considered. Parental care must have made its beneficent appearance as an agency essential to the survival of the better fitted, of the higher gifted. Sympathy and altruism arose thus as advantageous variations, securing by their presence longer play and developing periods (Karl Groos) so necessary in phylogenetic development. In the second volume the suggestive and interesting experiments on the temperature of different animals during hatching and incubation are given more fully than in the author's first communications.

Many facts are adduced of the rise and growth of parental care, first in the cold-blooded animals, then in the warm-blooded types, then among mankind. This growth is also well described among the savages, civilized and cultured races and classes. Conjugal tenderness and fidelity begin only on the level of the warm-blooded animals. As the sympathetic tendencies increase in the human races there dawn the

feelings of chastity, modesty, etc. He combats with right Westermarck's doctrine that fear and hatred of incest are instinctive. Parental care, sympathy and solicitude extend gradually to the members of the family and finally to the members of the community, guild and race. Thus the stoic cosmopolite is, in some respects at least, the acme of civilization. This feeling of sympathy, so helpful and advantageous, biologically speaking, is strongly evidenced in the multitudinous hospitals, asylums and similar institutions of this century. (Parenthetically it may be mentioned that Ohio in 1894 contributed $1,146,721 to feed the paupers of the State and $4,175,915 for all charitable purposes; the sum-total of the incomes of all the colleges and universities in the State amounted to less than $1,000,000.)

The suggestive point is made that morality grows out of the family (perihestic), while public law springs out of the uniform usages outside the family (aphestic). Public law has its origin rather in the *hunger* tendencies of the race, in feuds, retaliation, arbitration, police necessities, etc. Thus public law never gave rise to any moral feeling, but moral feeling gave rise to corresponding public laws.

Since sympathy is emotional, an examination is made of the nature of the emotions and of their physical basis or concomitance. The James-Lange theory is presented, though worked out independently of them both. Mind is the continuous consciousness of sensations and emotions, the former arising from variations in sense organs, the latter from variations in the general vascular tone of the body. The biological necessity of fear, joy, etc., and their connections with the action of the vascular system are pointed out.

In criticism several points may with advantage be raised. In the love and hunger series of tendencies the implication is that if one (sympathy) is moral the other is either immoral or non-moral. The judgment of the race affirms that both are necessary, useful, good and moral when they are conducive to the race in general. That is the biological test of the ages. The speculative theories of the past were brilliant guesses. As a general rule they mixed up gloriously the ought with the actual. The motive, for example, does not justify and make an action moral unless it is conducive to the greatest good of that particular species or of the race. Neither is the hedonistic doctrine any better. The test of the age is not is he happy or is he not. That is not what history and science call the fittest in survival. The fittest has been of various kinds and forms. At one time it is lying, stealing, might, courage, at another their opposites. At one time it is intellectual in its nature (Kidd's Social Evolution), at another emo-

tional and at another volitional. Moral (human) conduct is that sum of habitual human actions which are conducive to the general good. This is no speculation, but the general test of the ages. Ethics as a science deals with the 'oughts' of history, their rise and fall, the causes of their success and failure. It deals with uniformities in the actions of men, their causes and probable continuance. As such it is a part of psychology and rests ultimately upon biological principles.

The measure of morality is the measure of fitness and accuracy of adaptation or attention. It is not a question as to whether a certain action produces pain or pleasure—upon that subject the success and progress of the world have not hinged—nor is it a question as to complexity, coördination or apparent goodness in itself of an action—for a jewelled watch is of no value or 'no good' in sunless obscurity; but it is an important issue as to whether an action has been of some value or of some advantage to the needs of the environment, present or future. Appropriation of property may be painful or pleasurable; it is in itself, however, neither right nor wrong. When appropriated by the State, whether from a willing or an unwilling subject, it is considered a good act on this condition, that it is for the greatest good of the greatest number. Appropriation of property for an evil purpose is theft. *Suum cuique* is a false definition of justice.

"Thou shalt not kill" either thy neighbor or thyself. But we praise the action of a Winkelried or a Christ, who marched to voluntary deaths. The man whose voluntary death is of disadvantage to his family and to the community at large we call a suicide. Moreover, that which was useful once may not be useful now. The tiger's fierce passions may be hurtful possessions to-day. In short, morality is measured and always has been measured in the great world's perspective by the degree of advantageous adaptation. Ethics as a science leaves the narrow anthropocentric attitude of Kant and the Hedonists and assumes the wider view of an objective, biological standpoint.

The author has, I believe, failed to analyze this important point, which has such a vital connection with his subject-matter. He says, "Right conduct arises from the moral instinct, after due allowance has been made for the reasonable exercise of the self-preserving instinct," p. 19. Again, "As a rule, moral conduct is right conduct; in other words, our moral or sympathetic instincts in general impel us to what is for the good of our race as a whole, but not always," p. 18. That is to say, Mr. Sutherland does not fully identify moral conduct with right conduct. Sympathy (his morality) does not constitute in his opinion the highest and truest test of right conduct. This point

certainly needs more careful analysis. Furthermore, the hunger side of our tendencies, or as Benjamin Kidd in his much and rightly abused book would say, the rational or intellectual side of our nature, should not be burdened with the evilly significant term 'selfish.' The modern world of inventions and culture can ill afford to endure a speculative philosopher's assertion that such are selfish, or are not conducive to the good of the race.

Mr. Sutherland fails again to make a clear and firm analysis of the terms mentioned in the following extracts: "that moral instinct which, with its concomitant intelligence, forms the noblest feature as yet visible on this ancient earth of ours" (p. 1); "the moral instinct with all its accompanying accessories, the sense of duty, the feeling of self-respect, the enthusiasm of both the tender and the manly ideal of ethic beauty" (p. 2). One of the clearest expositions the writer has seen of these phenomena is that of Dr. J. H. Leuba's, 'The Psycho-Physiology of the Moral Imperative' in the *American Journal of Psychology*, Vol. VIII., No. 4.

In a word, the author has given us an excellent treatise on the rise and growth of sympathetic reflex actions. The closing words of his introductory remarks are significant: "Hence the moral instinct is not an instinct of right conduct, a thing which has no existence, but an instinct, mainly sympathetic, which we find it conducive to man's highest good to encourage, by giving to the actions which it prompts the approving name of right conduct" (p. 19).

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The Instincts and Habits of the Solitary Wasps. GEORGE W. PECKHAM and ELIZABETH G. PECKHAM. Madison, Wis., Published by the State. 1898. Pp. 245. With Plates.

This work, as the record of careful and patient observation of forty-five species of solitary wasps, is of considerable interest to the comparative psychologist. The authors find these wasps to have large variability, individuality and intelligence. "The social hymenoptera are born into a community, and their mental processes may be modified and assisted by education and imitation, but the solitary wasp (with rare exceptions) comes into the world absolutely alone. It has no knowledge of its progenitors, which have perished long before, and no relations with others of its kind. It must then depend entirely upon its inherited instincts to determine the form of its activities, and although these instincts are much more flexible than has been generally sup-

posed, and are often modified by individual judgment and experience, they are still so complex and remarkable as to offer a wide field for study and speculation." The remark about absence of imitation rather conflicts with page 228, where the imitative acts are made a distinct variety. The most striking observation on intelligence is that of one Ammophila (p. 23) which picked up a pebble in her mandibles and used it to hammer the earth smooth over her nest. This seemed a case of improvising a tool and making an intelligent use of it. The account is corroborated by a report from an independent observer. Another remarkable instance of intelligence was the hanging of spiders in plants to keep them out of the way of ants, which was noted in several individuals. The comparative activity (pp. 150, 158) is also notable. The luring (p. 115) may have been either self-deception or confusion.

The authors' studies do not uphold the idea as to the wonderful stinging instinct by which the wasp is supposed always to hit the nerve center of spiders, etc., in such a way as to produce permanent paralysis, and so give fresh food to its future offspring. They show that the results of stinging are extremely variable, and that larvæ subsist healthily upon dead material. The authors do not make it clear how far the wasp consciously uses its sting as subjugating weapon, aiming at large and vital parts, or whether it be mere imperfect instinct (cf. pp. 203, 227, 232). The writers find no sense of direction in wasps, but their numerous observations show that wasps carefully study localities and note landmarks, and yet frequently lose their nests. (Yet here again there is not complete consistency, cf. pp. 60 and 8.) The psychological analysis is not as clear and thorough as we could wish. There is too much careless writing of this sort: "Just here must be told the story of one little wasp whose individuality stands out in our minds more distinctly than that of any of the others. We remember her as the most fastidious and perfect little worker of the whole season, so nice was she in her adaptation of means to ends, so busy and contented in her labor of love, and so pretty in her pride over her contemplated work" (p. 22). Our general impression from this work is that the solitary wasps, while obeying general instinctive impulses, as stinging, nesting, etc., are far more largely than is generally supposed guided by intelligence in the specific applications. It is to be hoped that the authors pursue their studies, especially in the way of experiment, and extend their work to the social wasps on the lines intimated on page 68. They might also tell us whether wasps numerate, play, and what emotions they have.

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The Essence of Revenge. DR. E. WESTERMARCK. Mind, July, 1898.

Dr. E. Westermarck opens this article by a sharp criticism of Dr. Steinmetz's theory that revenge is essentially a mode of enhancing the self-feeling, and in its earliest form is undirected, falling upon any convenient victim rather than the real aggressor. He points out that the instances of undirected revenge adduced by Steinmetz are irrelevant or tend the other way, and he thinks that the so-called instance of undirected revenge is merely either "sudden anger or it is the outburst of a wounded 'self-feeling,' which, when not directed against its proper object, can afford only an inadequate consolation to a revengeful man." We may observe on this matter that an oriental despot in massacring a host of non-aggressors merely to enhance his power and dignity is plainly not moved by revenge. However, the running amuck by a Malay, or the assassination of an innocent Empress by an anarchist, may be generally directed revenge and misdirected, but not undirected revenge. Certainly Dr. Westermarck's contention seems sound, namely, that revenge is not at first undiscriminating, not a purely subjective exaltation of selfhood which bears no definite action and feeling toward aggressor as such. To our modern individualism much savage revenge must appear undiscriminating when it really is directed to what it judges collective responsibility.

After remarking on cases of revenge among animals which indicate discrimination, and then touching on the close connection of anger and revenge, Dr. Westermarck briefly indicates the function of revenge in self-conservation and self-furtherance. It would, of course, require a volume to treat properly the natural history of revenge, its culmination as life factor, and its decadence in its primitive forms in the highest civilization. The duel is survival form, and I think the admiration shown for a murderer by many women in civilization probably is survival of the ancient savage feminine admiration of the most successful head-hunter. On the other hand, Britain's vengefulness protects her citizens in all parts of the world, and 'Revenge the Maine!' was lately the war-cry of a great nation. Dr. Westermarck agrees with Dr. Steinmetz that strict equivalence is not a general law of revenge. He instances Hannibal slaying 3,000 captives in revenge for the death of his grandfather, but I doubt that Hannibal would acknowledge injustice. Revenge gets even from its own point of view. Dr. Westermarck distinguishes equivalence as qualitative and quantitative, and ascribes qualitative—'the paying back in his own coin'—mainly to 'wounded pride,' but maintains that quantita-

tive is determined by public opinion. "If the offender is one with whose feelings men naturally sympathize this sympathy will keep the desire to see him punished within certain limits, and if they sympathize equally with the suffering of the offender and with that of his victim they will demand a punishment only equal to the offense. This demand, in combination with the rough ideas natural to an uncultured mind that offense and punishment are to be measured by their external aspects, lies at the foundation of the strict rule of equivalence, which is thus an expression, not of an unrestrained barbarism, but of advancement in humanity and civilization. If this explanation be the correct one the rule in question must have been originally restricted to offenses committed by fellow-tribesmen, as public opinion could not otherwise have been an impartial judge." However, is it not the natural tendency of revenge to hurt the other as bad in the same kind? And does not the regulation of revenge proceed mainly from caution, both of the revenger, who fears counter reprisal, and of his kin and friends, who have to undertake any revenge for him? No one but an absolute despot can afford to retaliate every aggression with death. In savage life an individual who always sets out on death-dealing revenge would get short shrift himself; and thus natural selection weeds out both the over-revengeful and the under-revengeful, and establishes a tit-for-tat, which comes to be natural justice, as the simplest law of socialization. Dr. Westermarck intimates and asserts that sympathy of companions as regulating revenge moulds moral consciousness, but he does not develop with any clearness or fullness a most interesting point which lies out of the direct scope of his paper. Certainly, a simpler solution of the duty-consciousness lies in the revenge become not merely impulsive, but compulsive, at urging of wife, children and relatives, a duty to be done.

With some remarks on intention in revenge and on the comparative method of study, Dr. Westermarck closes a paper which certainly advances our knowledge of the subject, but which on some points is more suggestive than conclusive.

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An Introductory Logic. JAMES EDWIN CREIGHTON. New York, The Macmillan Company. 1898. Pp. vii+387.

In this volume Professor Creighton has presented very clearly the essentials of the traditional logic, which at the same time he has supplemented with an admirable statement of the salient features of the

modern logic. An introductory outline of his treatment of the subject is followed by a brief historical sketch which serves to indicate the several phases through which logic in its development has passed. This gives to the student at the very beginning a point of view and a general conception of the scope of the subject. It also tends to stimulate his interest in the following portions of the book. The author divides the subject-matter into three parts: the first treats of the deductive logic; the second, of the inductive; and the third, of the general theory of logic.

The first part begins with a general account of the syllogism, reserving, however, for a subsequent chapter the detailed discussion concerning the specific rules of the syllogism and their application. This procedure seems to me to be a very happy one, as it opens up the subject at that point which is most familiar to those who have never studied logic, and yet who, in a vague way at least, have some notion of the inferential processes which, to their minds, it may be, are almost, if not altogether, synonymous with logic itself. Thus starting on somewhat familiar ground, this much is gained, that the student is not at the outset deterred by the array of definitions which in most text-books on formal logic seem to block the way to the heart of the subject. Though it may not be as strictly logical a procedure, yet for pedagogical reasons it is better to begin at the center with some idea of the meaning of inference, and thence work towards the elementary material which environs it. Throughout the treatment of the deductive logic there is a clearness of statement, and also a due sense of proportion in passing over, with but a brief mention, such portions as have historical rather than present interest either of a speculative or of a practical nature, as, for instance, the subject of reduction. Professor Creighton's illustrations and examples are not of the conventional order, and, therefore, they do not leave the impression which traditional examples in logic so often do leave, namely, that syllogistic reasoning has no counterpart in the actual inferences of everyday life.

In the author's exposition of the inductive logic we find that the practical procedure in inductive investigation is kept prominently in view, and the various methods of research are clearly explained in the concrete by giving a number of appropriate examples of actual experiments whose results have materially augmented the wealth of scientific knowledge.

Professor Creighton's classification of the inductive methods seems to me to be somewhat at fault. He divides the methods into

those of observation and those of explanation; the former embrace the methods of enumeration, of statistics and of causal determination; and the latter, the methods of explanation, are chiefly the methods of analogy and hypothesis. My criticism of this division is that causal determination is in itself an explanation. It is true that the causal relation is generally further analyzed or simplified by analogy or by some hypothesis, but for the most part the hypothesis or analogy explains by referring to some underlying causal connection. It is due to Professor Creighton to state that he himself acknowledges that in this classification the difference between the two kinds of methods is one of degree rather than of essential nature[1] and yet it perhaps would have been better not to make a distinction which is not one of essential nature the basis for differentiating so prominently these methods of research.

In the third section, which treats of the nature of thought, or the general theory of logic, the author's point of view is in its essential features quite in accord with that of Bosanquet. Professor Creighton insists upon the conception of thought as a living, growing phenomenon, and not a mere mechanical grouping of ready-made ideas, and also that the growth of thought is to be regarded as a process of development which proceeds ever from simpler to more complex states, according to the manner of all evolutionary processes. He regards the judgment as the unit of thought, and defines the concept as 'the series of judgments which have already been made.'[2] By way of comment upon this definition of concept, he adds that "to make the thought our own, to gain the real concept, it is necessary to draw out or realize to ourselves the actual set of judgments for which the word is but the shorthand expression."[3] The concept, however, is not merely a summation of a number of judgments. It is rather a blending of the various elements which the several judgments have furnished in such a way that these judgments which have been operative in the formation of the concept are implicitly rather than explicitly apprehended. For there is such a thing as an implicit apprehension of the significance of a whole without a conscious analysis of its component parts, as Mr. Stout has so admirably set forth in his *Analytic Psychology*. The function of the concept is essentially 'adjectival' until it is subjected to an analysis which discloses explicitly the parts which form the 'actual set of judgments' but which before such analysis were discerned implicity.

Professor Creighton has stoutly defended the necessity of a uni-

[1] P. 220. [2] P. 270. [3] P. 271.

versal element in some form or other as the ground of inference. In this view he takes exception to Mill's contention that reasoning is from particular to particular. The author very happily sums up the argument in support of his position in the following sentences, which clearly indicate his general point of view as regards the theory of inference: "Knowledge sees the universal in the particular, or reads the particular as a case of the universal. And when thus interpreted the particular ceases to be a bare particular and becomes an individual with a permanent nature of its own. When one reasons from an individual case, then it is the universal or typical nature, not the particular or momentary existence, upon which the inference proceeds. If there were any merely particular facts in knowledge we could never reason from them. But the so-called particular facts, as elements of knowledge, possess a universal or typical aspect in virtue of which alone inference is possible."[1]

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L'Éducation Rationelle de la Volonté: Son emploi thérapeutique. PAUL ÉMILE LÉVY. Préface de M. le DR. BERNHEIM. Paris, Alcan. 1898. Pp. v + 234.

Dr. Lévy divides his monograph into two sections, a 'Theoretical Study' and 'Practical Applications.'

From the theoretical point of view, psychotherapy is based upon one fundamental principle: "Thought is in act in the nascent state; it is a beginning of activity. * * * The transformation of the idea into an act may take place in two distinct ways. Either the idea becomes a *positive* act, *i. e.*, feeling, volition, sensation, movement, or it becomes a *negative* act—in other words, it neutralizes the act, prevents the feeling, the volition, the sensation, the movement from being realized (*se produire*). Dynamogeny, inhibition—these are, briefly, two aspects of the same process." (Pp. 13, 14.)

Granting this principle, all that is needed to bring about any given change is to awaken in the mind an idea of the change in question, *i. e.*, to give a suggestion. The suggestion may be administered by another (81–97) (hetero-suggestion), or by the patient himself (auto-suggestion). It is with the latter only that Dr. Lévy concerns himself. To make the auto-suggestion most effective it should be administered in a state of mental repose (49) (*recueillement*), and should be reinforced, when possible, by directing upon it any available emotion

[1] P. 344.

(55), and by the deliberate adoption of such conduct as the suggestion would itself, if realized, inspire (63–79) (*entrainement actif*). The suggestion should not be in the form of an effort to will its realization; it should rather be put as a categorical statement (52), but voluntary attention should be concentrated upon it to ensure its taking root (32) (52, note) (128).

The same principle may be applied to the realization of a highly abstract ideal (Mental Hygiene, 99–120). By fixing the concept of the ideal in mind as an auto-suggestion its influence will be felt at unexpected moments, modifying the details of conduct.

By *will* we mean nothing more than the resultant (125), as expressed in conduct, of all the active tendencies of simultaneously coexisting ideas, but it must be remembered that a small part only of these (126) are conscious, the larger part being subconscious. The weakness of will which prevails in modern society (French society?) is due to the fact that the intellectual, social and political upheavals of the last century have undermined the definite convictions which ruled the conduct of our ancestors and have given us nothing in their place (121–125). It is obvious (127 ff.) that the theory of auto-suggestion, supplemented by hetero-suggestion, is the only scientific method of training the will and developing character.

Such is Dr. Lévy's theory. It embraces much that is true—although nothing new—but it suffers from a lack of what may be termed the quantitative sense, and an indifference to the niceties of conceptional discrimination. To take the last first, surely it is only by doing violence to the plain meaning of words that the tendency spontaneously to adopt the beliefs of others, the tendency on the part of certain ideas to give rise to the corresponding sensation, and on the part of other ideas to give rise to a movement, are all subsumed under the concept of 'nascent act,' which is strictly applicable to the last only of the three. There is an analogy between these three tendencies, but they are far from identical.

The quantitative sense is the ability to discriminate tendencies from necessary causal relations, possibilities from probabilities, and this Dr. Lévy seems to lack. The facts now in hand go far towards rendering plausible the hypothesis that every mental state possesses—perhaps vicariously, as the representative of cortical process—certain intrinsic tendencies, which, when the inhibition of other states is removed, would result in such determinate events as the development of an illusion, the suggestion of an associated idea, the production of a movement, the modification of metabolism. But to base upon such a

doctrine the elaborate system of practice proposed by Dr. Lévy and to hold forth such confident hopes to those who stand in need of aid is a very different matter. Such a leap should be taken only after the practicability of the proposed method has been demonstrated. What has Dr. Lévy done towards demonstrating it?

He has conducted experiments for four (218) months upon himself and six other persons. We are told nothing of the physical or mental traits of these other persons, although it would appear (p. 185) that one at least, 'C,' was an advanced hysteric. Such details are quite irrelevant to the question, Dr. Lévy thinks (217). Nor are we told anything of their reliability as witnesses; merely that (145, note) each one must have known whether the results he reports were due to suggestion or to coincidence. We are, however, told that no one of them received more than ten or fifteen minutes' instruction from Dr. Lévy (218) as to the method of experimenting and of recording experiments. No record whatever is made of the negative results, though we are told that two subjects, whether two of the above mentioned six or not is not stated, could get no positive results (219). Of the positive results some are given. A few illustrations taken at random will give an idea of their character.

"One of my subjects, a merchant, frequently, before going to see his customers, gave himself the suggestion to succeed in the business which he had to do with them. Often, he said, the suggestion was followed by the desired result" (162). This is due, Dr. Lévy thinks, to the greater self-confidence and persuasiveness imparted by the suggestion.

Or an observation of Coste de Lagrave's—"I sing badly; I resort to the auto-suggestion that I should sing with taste, should give pleasure to the audience; I receive compliments for the first time in my life" (162).

"I try to concentrate my mind upon my work alone, to the exclusion of all else in life. I note at the end of the afternoon that my time has been much better spent than usual" (160).

"After having grippe, though a light attack, I used to lie thenceforward quite a while before I could go to sleep, and woke two or three times every night. These disturbances lasted about a week; in about the same time I succeeded in making them disappear by auto-suggestion" (172).

"Trembling of the right hand had lasted about two months when the patient thought of treating it by auto-suggestion. Was improved after several attempts, then definitely cured in a period of time the duration of which is not clearly marked" (189).

"Very violent headache, only in temple and forehead, with throbs. Cure very rapid by auto-suggestion" (190).

Severe itching in three middle fingers of right hand, lasting a week, cured in four or five days by auto-suggestion (201).

"Being dyspeptic and having no appetite I give myself the suggestion to be hungry. At the next meal I really eat with very good appetite" (206).

A few of Dr. Lévy's cases are better than these, but the great majority are marked by the same disregard of essential details, and the same reckless ascription of the result to the suggestion, when it might obviously have been due to some totally different cause, which makes these cases worthless.

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L'Absolu et sa loi constitutive. CYRILLE BLONDEAU. Paris, Alcan. 1897. Pp. xxv + 350.

The 'Absolute' is the immutable universe in which things and thoughts are alike confounded. 'The higher law from which results nature or life' is formulated as follows: "The mutual relation of the elements which constitute a body is in inverse ratio to the relation of these elements to the environment which contains the body" (p. 344). This is put forth, in all seriousness, as a revelation of the world's 'most secret resources.'

The only thing in the book of any special interest to the psychologist is the author's conception of the relation of physiological process to the facts of consciousness. He speaks of this as a discovery of 'the passage from physiology to psychology' and regards it as an achievement of cardinal importance in his discussion (p. xxi), enabling the intelligence 'to radiate freely in the world without finding any further obstacle to its infinite expansion' (p. 114). What then is the fulfilment of this profession? First, a reassertion of a solution of continuity between physiology and psychology; secondly, the assertion of a similar abyss between consciousness made up of sensations and images and the pure reflecting activity of the mind; thirdly, as explanatory theory, the assertion of relatively free forces at different levels in the nervous system by virtue of which sensations are, on the one hand, perceived and, on the other, reflected on. "The sensations and images are perceived by the free force most directly related to the force subject to the external and internal action; the parts more indirectly related to the sense organs are now, in virtue of their saturation

and the law of equilibrium, able to exercise themselves on those which furnish the sensations and images" (p. 129). "Thus the inner world is broken up into two parts: one belongs provisionally to the thing whence the action emanates, the other remains outside, and it is solely by this part of the inner force not absorbed, free, therefore, relatively to that particular connection, that it is permitted to perceive the sensation, which is thus, in principle, nothing but a relation of inner to outer" (p. 132). As a purely physiological hypothesis much can be said in favor of the conception of lower- and higher-level centers with which related but relatively independent stores of disposable energy are incorporated, corresponding respectively to lower and higher processes of consciousness; but to see in such an hypothesis—which, morever, is not new—'the passage from physiology to psychology' requires surely more than ordinary clairvoyance.

The book abounds in apothegm and paradox ('consciousness contradicts reason,' 'the love of truth is not reasonable,' etc.), and is not wholly free from contradiction ('one must be convinced of human liberty relatively to the absolute,' p. 208; 'from the absolute point of view there is no liberty,' p. 69; cf. p. 211, 'conciousness is only free relatively to things'). Its pretensions are preposterous (*e. g.*, p. xix), its style insipid, its construction loose, like the jottings of a note-book. There is much by the way to stimulate reflection, but in the end epigram on the absolute and its constitutive law through nearly four hundred closely printed pages becomes not a little tedious.

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Ueber die Messung der Auffassungsfähigkeit. LUDWIG CRON und EMIL KRAEPELIN. Separat Abdruck aus: Kraepelin, *Psycholog. Arbeiten.* II. Bd. 2 Heft. Pp. 203–325. Leipzig, 1897.

This is an account of experiments conducted primarily to determine the influence which the peculiarities of the individual exert upon the form of the apperceptive faculty and to discover the common factors involved in the act of apprehending. Subjects were kept at the continuous apprehension of printed words and an attempt made to estimate the precision and reliability of the performance. For this purpose the region of the threshold was used, *i. e.*, stimuli were presented to the eye only for so long a time that they could be perceived in a number of cases but not always distinctly. The number of correctly read stimuli furnished a measure for the ability of apprehending, while from the incorrect readings deductions could be made as to the

action of error processes. The experiment consisted essentially of three drums on which were pasted, in spiral form, (1) nonsense syllables, (2) one-syllable words, (3) two-syllable words. The drums revolved at a constant speed of 24 mm. per second, and were observed through an opening or slit in a screen from a fixed distance. The observation slit, 5 mm. in height, was regulated in width by means of a micrometer screw, so that the time during which the stimulus was visible could be varied. Three different widths were used, 5, 4 and 3 mm. By means of a contact arrangement, which noted the entrance of each letter into the field of vision and its disappearance, the duration of visibility could be exactly measured. Such measurements gave for the three different slit widths, 290, 230 and 170 thousandths of a second, respectively. Each subject endeavored to read aloud the words as they passed the opening of the screen and the correct readings, errors and omissions were noted down in shorthand by the experimenter. The same experiment was performed on three different days. There were six subjects, three normal and three pathological cases from a clinic.

The results show surprising differences in capacity to apprehend the matter presented. Certain facts and principles, however, were common to all.

Results of experiments with nonsense syllables show that the greater part of the syllables were correctly read, the number decreasing with the narrowing of the observation slit, yet more slowly than the visibility. On shortening the time of exposure one-fifth, correct readings showed only an insignificant decrease. In the normal subjects at 4 mm. the limit was very nearly reached beyond which a wider opening could effect little improvement. As the time of exposure was shortened, omissions became decidedly more numerous, while errors showed only a moderate increase, omissions being evidently the measure of the difficulty of apprehension. Errors in which only one letter was misread predominated. The first letter was by far the most frequently misread, the last next; the middle letter, least of all, indicating that the attention was directed especially to the middle so that the syllable was taken as a unity. The difference in apprehending the first and the last letter is ascribed by the authors to incomplete cessation of attention. The single syllables here follow one another every 1¼ sec., but 2 sec. is the most favorable space of time between signal and stimulus for the complete cessation of attention. This would hinder the apprehension of the first letter to a greater degree than the last.

One-syllable words. Results show a greater facility in apprehending than for nonsense syllables, notwithstanding the greater number of letters to a word. The word-idea present in the process of apprehension is assigned as the cause. The number of correct readings sank 10% with the narrowing of the observation opening from 5 mm. to 3 mm., a smaller diminution than resulted in the case of nonsense syllable under like conditions. Single-letter errors are most numerous, two-letter errors only slightly less. The initial letter is almost always relatively well recognized here because a capital and so attracting the attention. The second letter is generally indistinctly apprehended, the third favored, the fourth neglected, indicating a two-fold rhythm of apprehension. The number of nonsense misreadings out of the total misreadings varies in the different subjects from 6% to 31%. From the number of nonsense misreadings deductions are made as to the influence of word-ideas. Such influence is maintained to be greater the smaller the number of nonsense misreadings. Two classes of misreadings are made, namely, those which occur in the same word again, and those which are repeated in different words. In the former an error once committed becomes fixed, while in the latter an idea has acquired such power that it moves the thoughts in a certain direction. This is indicated by such errors as Heft for Kost, Heil and Geist; Stadt for Sold, Stoltz, Druck, Stift, Saar, Staub, Wohl and Stern, where little connection is apparent between stimulus and error, but evidently an impulse present to express an idea whose content is from another source.

Two-syllable words. In apprehending two-syllable words two subjects showed a better record than in the two previous experiments; in others, however, there was a falling-off showing itself in the number of omissions, the number of errors remaining about the same. According to the view previously noted this would indicate greater difficulty in recognizing words with less liability to error. The apprehension here, unlike that of shorter words, takes place by spelling, giving little opportunity for conjecture and influence of ideas, hence greater accuracy. The initial letter is again distinctly favored. The rhythm of apprehension which was earlier expressed only in two subjects appeared very distinctly in others. One subject appeared to recognize best the first and fifth letters, indicating a grouping of greater extensity. The same misreadings were not so frequently repeated in different words as in the case of one-syllable words.

As a rule the number of correct readings increased from day to day. The improvement from the first to the second day is much more

pronounced than for the second to the third day. This the authors attribute to the influence of habit rather than to facility gained by practice, for the former exerted in the control of disturbing processes reaches its height under such conditions quicker than the latter. Practice quite generally in the experiments shortens the time of perception and, according as the inclination is to misreadings or omission, causes a decrease of the former or latter. Fatigue, which appears to stand in close relation to practice, develops the opposite effects, yet, on account of the changing conditions of work and the short time of the experiment, its effect was limited.

From the results obtained conclusions are drawn as to the different influences which determine the formation of the process of apprehension. Such influences are: (1) quickness of perception, which determines the distinctness of the impressions; (2) articulation of apprehension, which determines the clearness of the constituent parts of the impression; (3) sensuous precision of perception and influence of ideas, which affect the reliableness of apprehension; (4) the more or less striving or effort to make the best possible record, which leads to the suppression of readings felt to be erroneous; (5) practice and fatigue; (6) memory, noticeable in the frequent return of the same misreading in the same word.

The combined effect of these conditions occurring with different strength in the individual observers determines the aptness of apprehension. In closing, a characterization of the different subjects is made on the basis of the proportion and combination of those influences appearing in the investigation.

E. C. JONES.

YALE UNIVERSITY.

Aussenwelt und Innenwelt, Leib und Seele. JOHANNES REHMKE. Rektorats rede Univ., Greifswald. Greifswald, 1898. Pp. 48.

Zur Parallelismusfrage. G. HEYMANS. Zeitschrift für Psychologie, Bd. XVII., Heft, I.–II., S. 62.

Die erkenntnisstheoretische Stellung des Psychologen. RUD. WEINMANN. Zeitschrift für Psychologie, Bd. XVII., Heft 3, 4, S. 215.

Professor Rehmke has given us, in his inaugural address of last spring, what is designed as an exhaustive statement of the possibilities of general theory touching the relation of mind and body, and a decision on logical grounds in favor of interaction. In a preliminary historical sketch his aim is to show in their simplicity the logical motives that have forced the development of theory. In his direct treat-

ment of the problem the distinction between the thing or (more generally) the existence, and its properties, furnishes the basis. Ancient materialism regarded the mind as a thing, modern materialism as the property or peculiarity of a thing—the body or brain. The Platonic teaching and the author regard it not as a thing but as a separate immaterial existence. Solipsism regards the body as a property or peculiarity of the mind. Spinozism (a name that Dr. Rehmke gives to modern parallelism in general) accounts mind and body as equally properties or peculiarities of a substance which manifests itself in them. Experience tells us that mind and body are connected. Experience tells us also that the connection of 'things' is causal. If mind and body are both 'things,' they interact. But the mind is not a thing; the grounds need not be here repeated. In that case, it is held, it cannot be a party to interaction, for only natures alike in kind can interact. How then shall we understand the evident connection? Shall we say with modern materialism that the body (or brain) is the thing and the mind the property? But in no case, as here, can a thing be to all appearance fully conceived without its property, and its property without the thing, and against this as against the view that the body is a mere property of the mind the testimony of experience to the distinctness of mind and body in our world of reality is final. Are the two connected then as properties of a third somewhat? The Spinozistic doctrine merely repeats the fallacy of Occasionalism; it resorts to an alien substance to do what it has pronounced impossible. Experience does not show us a quality changing punctually of itself whenever another quality of the same existence changes. The connection of quality with quality must then on this view be causal. But two qualities of the same existence do not stand in causal relation to each other, nor an existence in causal relation to its qualities. We must recognize the following pair of first principles: (1) Only a separate existence suffers change; qualities cannot suffer it. (2) An existence suffers change only when there is another existence involved as the active condition of the change. (Reference to author's Lehrbuch d. Psych., S. 41–45, and *Zeits. f. imm. Phil.*, Bd. II., S. 349 ff.). Mind and body are accordingly separate existences interacting. The rule that all interacting existences must be alike in kind is a hasty generalization from the fact that interacting *things* are alike in kind. But is not the quantity of motion (Dr. Rehmke rejects the term 'energy' as vague) unalterable? How then can non-physical things produce it? The answer is that the law, which is universal, applies only where thing moves thing, not where a non-physical existence causes a

thing to gain or lose motion. How far, if at all, the brain loses motion when the mind is affected, and the mind parts with power (in any sense) when the brain is affected, we are not yet in a position to determine.

Dr. Rehmke's subtle and dexterous treatment of this much agitated question may be described as scholastic, if relentless logical analysis entirely without psychological analysis of the terms is the typical scholastic tendency. The argument seems to depend wholly on the finality and exhaustiveness of the distinction, as applied for instance to the mind, between a 'separate existence' and its 'properties.' It is curious to see so assured an idealist as Dr. Rehmke so confident of this. His remarks on parallelism, in part fruitfully suggestive, are vitiated by his confounding the modern theory in all its forms with Spinozism. Were Clifford and Fechner (themselves far enough apart) believers in a 'substance' of which mind and body were the 'properties'? Moreover, when the author speaks of the hypothesis that when a pin produces a wound, and through it a cerebral discharge, the pin's psychic counterpart produces the psychic counterpart of the bodily disturbances and then the pain accompanying the cerebral discharge, as a fancy too mystical to be entertained by the modern parallelist, he is tossing aside what many regard as of the essence of their principle. To substitute 'the conservation of motion' for that of energy, as though the former would be acknowledged tantamount to the latter, or more generally regarded as true, is a serious error. It should be remarked, too, that an author who uses the term 'the solipsists' to designate one of the schools of philosophical opinion should inform us who these thinkers may be and where they are to be found.

The best comment on the artificial method of Dr. Rehmke's essay is furnished by the second on our list; the article of a fellow-idealist defending 'monastic' parallelism from the attacks of Professor Stumpf and more recent writers. Dr. Heymans calls attention to many misunderstandings of the theory, rejects Spinoza's substance, and in a lengthened exposition explains that it is only from the convenient point of view of the human mind, which makes an independent enduring world of its own perceptions, instead of conceiving the world in the true terms of outer mind-stuff, and so doubles the facts, that there is any parallelism at all. The remainder of his article consists of acute replies to the recent assailants of the theory. The objections to it on the score of evidence he does not fully face. This essay is the most closely and carefully reasoned of the three before us.

The article on the epistemological position of the psychologist is

a vigorous defence of realism by psychological arguments. The author advances to battle with a light heart, and lays about him with boyish confidence against the whole host of contemporary German phenomenists, Schuppe, Schubert-Soldern, Kaufmann, Mach, Rehmke, Leclair, Laas, Cornelius, Avenarius; that is to say, the school of 'immanente Philosophie,' the strict sect of Avenarius, and certain detached kinsfolk of these. "The psychological compulsion which drives us to apprehend that which we are conscious of, which we experience, as objective, is no mere jest which our Psyche perpetrates, but an instinctive indication of the view to which the purely philosophical and logical consideration of the matter of experience by rightful consequence leads." Various departments of psychology are drawn upon to show the underlying realistic assumption of the science. Much is made of the argument that idealism does away with the distinction between psychology and other sciences. It can hardly be said that the article exhibits a delicate sense of the besetting difficulties of the long-vexed problem or a complete grasp of the opinions it condemns. It is a philosophical instance of the illusion of simplicity.

D. A. MILLER.

PHILADELPHIA.

NEW BOOKS.

Social Elements. C. R. HENDERSON. New York, Scribners. 1898. Pp. ix + 405.

Le Rôle Social de la Femme. Mme. A. LAMPÉRIÈRE. Paris, Alcan. 1898. Pp. 175. Fr. 2.75.

La Psicologia contemporanea. GUIDO VILLA. Bibliot. di Scienze Moderne. Turin, Bocca. 1899. Pp. 660. Lire 14.

Report of U. S. Commissioner of Education, 1896–7. W. F. HARRIS, Vol. 2. Washington, Govt. Press. 1898. Pp. vii and 1137–2390.

L'Instabitité mentale. G. L. DUPRAT. Paris, Alcan. 1898. Pp. 310.

Wild Animals I have Known. E. S. THOMPSON. New York, Scribners. 1898. Pp. 358. $2.50.

A delightful series of chapters on animal genius-heroes. Mr. Thompson ought to tell us more explicitly, however, just what incidents the psychologist may quote on his authority as a naturalist!

J. M. B.

Democracy. A Study of Government. J. H. HYSLOP. New York, Scribners. 1899. Pp. xiv + 300.

The First Philosophers of Greece. A. FAIRBANKS. New York, Scribners. 1898. Pp. vii + 300. $2.00.

Footnotes to Evolution. D. S. JORDAN and others. New York, Appletons. 1898. Pp. viii + 392.

Leibnitz, The Monadology and other Philosophical Writings. R. LATTA. Oxford, Clarendon Press. 1898. Pp. 437.

Principles of Biology. HERBERT SPENCER. Revised and enlarged edition. Vol. I. New York, Appletons. 1898. Pp. xii + 706.

Die Spiele der Menschen. KARL GROOS. Jena, Fischer. 1899. Pp. viii + 538.

Christian Science. A Sociological Study. C. A. L. REID. Cincinnati, McClelland. 1898. Pp. 32.

A spirited negative examination of Christian Science by a physician. His paper is printed by request of the Northwestern Ohio Medical Association, before which it was read.

Double Personality. Lenten Hysteria. W. L. HOWARD. Two papers reprinted from the Maryland Medical Journal. Pp. 4 and 4.

Intensitätsschwankungen eben mekliche optischer und akustischer Eindrücke. W. H. HEINRICH. Se;. Abd. aus Anz. d. Akac. d. Wiss. in Krakau. Nov., 1898. Pp. 365–381.

The Scottish Contribution to Moral Philosophy. J. SETH. Inaug. Lect. Univ. of Edinburgh. Edinburgh and London, Blackwood. 1898. Pp. 43. 6d.

Ueber unsere gegenwärtige Kenntniss vom Ursprung des Menschen. By E. HAECKEL. Bonn, Strauss. 1898.

Ueber die Grundvoraussetzungen der individualistischen Weltanschauung. By W. LUTOSLAWSKI. Helsingfors, J. Simèlii Erben. 1898. Pp. 88.

The Message of the World's Religions. Reprinted from *The Outlook.* New York, Longmans. 1898. Pp. 125.

A series of chapters giving the point of view of each of the great religions, *i. e.*, Judaism (Rabbi Gottheil), Buddhism (Ruys Davids), Confucianism (A. H. Smith), Mohammedanism (G. Washburn), Brahmanism (Professor Lanman), Christianity (Lyman Abbott). A remarkably interesting little book. J. M. B.

The Beginnings of Art. E. GROSSE. New York, Appletons. 1897. Pp. xiv+327.

The German edition of this already well-known book was noticed at length in this REVIEW (III., 1896, p. 560). We need, therefore, only repeat our commendation of it, and strongly recommend the English version to psychologists. J. M. B.

CORRESPONDENCE AND NOTES.

PROPOSED CHANGES IN THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

At the recent meeting of the Association in New York, certain members proposed the formation of a separate section to be devoted to the reading and discussion of philosophical papers. On account of the small number present when the matter was brought up, decision was postponed until the next meeting, and the Secretary was requested to send out cards to all members asking for a general expression of opinion on the point.

Certainly, every member should have an opportunity to be heard with reference to a proposition which logically involves changes in the name and constitution of the Association, but a vote taken without discussion will fail to express the thoughtful wishes of the members. I venture to suggest that questions of sufficient importance to be referred to a vote of the whole Association ought to receive some attention in the pages of the REVIEW, and beg leave to restate some of the reasons why, in the interests of philosophy, as well as psychology, the proposed action seems unwise at the present time. Most of these reasons were mentioned in the discussion at the meeting.

First, judging from the experience of the programme committee, it would be difficult to arrange a programme for such a section without interfering with the regular meetings.

Second, our best psychologists are among our best philosophers, and their withdrawal from even a part of the meetings of the Association would be a serious loss. At the same time the greatest need of psychology at present is more of sound philosophy, and the greatest need of philosophy more of sound psychology. Closer union is more to be desired than further separation.

Third, philosophical papers are already welcome whenever they offer contributions to psychology or show the bearing of psychology

on problems of philosophy. This offers a wide range of subjects for those who are interested in any branch of philosophy, and such papers always form a part of our programme. So far as possible, they are grouped together in the same sessions.

Fourth, when it comes to the making of interesting programmes, philosophical subjects are by no means equal to scientific subjects. As a rule the papers are too long. Scientific theories and results can be stated briefly, but it takes time to set forth philosophical opinions. Such are not suitable subjects for general discussion, and discussion ought to be the most important feature of these meetings. There is no object in coming together to listen to papers which can be read at home. As a matter of fact, at our own meetings philosophical papers never called forth as much interest as the scientific, while attempts in other places to hold meetings for the exclusive discussion of problems in philosophy have repeatedly ended in failure.

Finally, the Association is now making splendid progress and is becoming a source of inspiration to workers in the field of psychology. At the same time it is doing a real and lasting service for philosophy in furthering the development of scientific spirit and methods in the realm of mental phenomena. Nevertheless much remains to be done before psychology comes into right relations with the rest of the sciences. There is need of all the wisdom and energy available to improve the character of our scientific work, and it is extremely important that no step be taken which will weaken the Association.

CHARLES B. BLISS.

(THE REVIEW is ready to print other concise opinions on this or other matters pertaining to the Association. J. M. B.)

MRS. LAURENCE HUTTON, whose interest in Miss Helen Keller is well known, allows us to print the following passage from a personal letter from Miss Keller to her, written under date of January 17, 1899. Psychologists will be interested in the passage, both because it is Miss Keller's and also because of the sentiment which her project embodies: "Have you seen Kipling's 'Dreaming True,' or 'Kitchener's School'? It is a very strong poem, and has set me to dreaming too. Of course you have read about the 'Gordon Memorial College,' which the English people are to erect at Khartoum. While I was thinking over the blessings that would come to the people of Egypt through this college, and eventually to England herself, there came into my heart the strong desire that my own dear country should in a similar way convert the terrible loss of her brave sons on the 'Maine' into a

like blessing to the people of Cuba. Would a college at Havana not be the noblest and most enduring monument that could be raised to the brave men of the 'Maine,' as well as a source of infinite good to all concerned? Imagine entering the Havana harbor, and having the pier, where the 'Maine' was anchored on that dreadful night when she was so mysteriously destroyed, pointed out to you, and being told that the great, beautiful building overlooking the spot was the 'Maine Memorial College,' erected by the American people, and having for its object the education both of Cubans and Spaniards! What a glorious triumph such a monument would be of the best and highest instincts of a Christian nation! In it there would be no suggestion of hatred or revenge, nor a trace of the old-time belief that might makes right. On the other hand, it would be a pledge to the world that we intend to stand by our declaration of war, and give Cuba to the Cubans, as soon as we have fitted them to assume the duties and responsibilities of a self-governing people."

J. M. B.

G. A. TAWNEY, Ph.D., has been promoted from Assistant to full Professor of Philosophy in Beloit College, Wis.

G. F. STOUT, editor of *Mind*, has been called from Aberdeen to the new Wilde Lectureship in Mental Philosophy, at Oxford.

PROFESSOR JAMES WARD'S Gifford Lectures on 'Naturalism and Agnosticism' are to be issued at once by the Macmillans. The same publishers are also to print Professor Royce's Gifford Lectures.

WE have received the first number of the new series of *l'Intermédière des Biologists*, to the title of which the words *et des Médicins* are added by the new editor, M. L. Hallion. It has several new and interesting features. With it comes to hand also the first issue of *l'Intermédière des Neurologistes et des Aliénistes*, edited by Dr. Paul Sollier.

WE notice that Mr. Brooks Adams' *Law of Civilization and Decay* is to be issued in French translation by Alcan, Paris.

PROFESSOR MARTIUS, of Bonn, succeeds Professor Riehl at Kiel, the latter going to Halle.

WE regret to record the death of Robert Zimmermann, the distinguished Herbartian writer on Æsthetics and Philosophy.

PROFESSOR HAECKEL'S interesting address (listed above) on *Der Ursprung des Menschen* has been brought out in book form by the Macmillans under the title 'The Last Link.'

M. SEAILLES has been appointed Professor of Philosophy in the University of Paris.

THE *Proceedings* of the National Educational Association (Washington meeting, 1898) are of more than usual interest. Papers by Royce, Krohn, Draper, Shaw, will interest psychologists, as will also the transactions of the child-study section. Taken with Commissioner Harris' admirable two-volume Report just published the educational world has an abundance of good reading.

J. M. B.

DR. E. B. MCGILVARY, Assistant Professor of Logic and the Theory of Knowledge in the University of California, has been appointed to the Sage Professorship of Moral Philosophy in Cornell University, to succeed Professor James Seth, now Professor of Moral Philosophy in the University of Edinburgh. Professor McGilvary made his chief philosophical studies at the University of California, and received there his degree of Ph.D., having previously won his M.A. at Princeton, and his A.B. at Davidson College, N. C. He will begin his duties at Cornell with the opening of the autumn term of 1899.

THE *Rivista Italiana of di filosofia* so long and so successfully edited by the lamented Professor Ferri, is to be continued under the title *Rivista filosofica*. It will be directed by Professor C. Cantoni of the University of Pavia.

BOOKS OF PHILOSOPHICAL INTEREST

TO BE PUBLISHED IN 1899.

BIOGRAPHY.

BENSON.—The Life and Letters of Archbishop Benson. By his Son.

NEWMAN.—Cardinal Newman, as Anglican and Catholic. With Correspondence. A Study of EDMUND SHERIDAN PURCELL, author of "The Life of Cardinal Manning." 2 vols. Cloth.

SPINOZA.—His Life and Philosophy. By Sir FREDERICK POLLOCK, LL.D., University of Oxford.

An account fairly complete and adequate in itself of the character and philosophy of Spinoza.

ECONOMICS, POLITICS, ETC.

PATTEN.—The Development of English Thought. A STUDY IN THE ECONOMIC INTERPRETATION OF HISTORY. By SIMON N. PATTEN, University of Pennsylvania. Cloth. 8vo. $3.00.

The purpose of this book is to bring out the connection between the economic events that determine a nation's prosperity and the thought and feelings of the people. English history has been chosen is the field of investigation because English development has been more normal and free from external influences than that of other modern nations.

BRADFORD.—The Lesson of Popular Government. By GAMALIEL BRADFORD. In two volumes. 8vo. *Just ready.*

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CLARK.—The Distribution of Wealth. By JOHN B. CLARK, Columbia Univer.

EATON.—The Government of Municipalities. By DORMAN B. EATON.

GIDDINGS.—Democracy and Empire. By FRANKLIN H. GIDDINGS, Columbia University, author of "Principles of Sociology," etc. Cloth. Medium 8vo.

OSTRAGORSKI.—The Organization of Political Parties. By M. OSTRAGORSKI. Translated by FREDERIC CLARKE. Introduction by JAMES BRYCE, author of "The American Commonwealth."

RICHMOND.—Friendly Visiting among the Poor. A Handbook for Charity Workers. By MARY E. RICHMOND, General Secretary of the Charity Organization Society, Baltimore. Cloth. 16mo. $1.00.

VEBLEN.—The Theory of the Leisure Class. An Economic Study in the Evolution of Institutions. By THORSTEIN B. VEBLEN, University of Chicago.

PHILOSOPHY—Mental and Moral.

BALDWIN.—Dictionary of Philosophy and Psychology. Edited by J. MARK BALDWIN, Princeton University.

ROGERS.—A Brief Introduction to Modern Philosophy. By ARTHUR KENYM ROGERS, Ph.D., Chicago University.

SULLIVAN.—Morality as a Religion. AN EXPOSITION OF SOME FIRST PRINCIPLES. By W. R. WASHINGTON SULLIVAN. Cloth. 12mo. $2.00.

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"The most vital, suggestive, helpful book we know in the whole range of theological writing at this period."—*The Times*, New York.

WARD.—Naturalism and Agnosticism. By JAMES WARD, LL.D., Professor of Mental Philosophy, Cambridge. The Gifford Lectures of 1895 and 1896.

1899 —The Statesman's Year Book. Statistical and Historical Annual of the States of the World in the year 1899. *American Edition.* Edited by CARROLL D. WRIGHT, LL.D. United States Commissioner of Labor, President American Statistical Association. Cloth. 12mo. $3.00, *net.*

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CLARKE.—The Science of Law and Lawmaking. Being an Introduction to Law, a General View of its Forms and Substance, and a discussion of the Question of Codification. By R. FLOYD CLARKE, A.B., LL.B., of the New York Bar. 8vo, cloth, gilt top, $4.00 *net*.

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MILLS.—The Nature and Development of Animal Intelligence. By WESLEY MILLS, M.D., D.V.S., F.R.S.C., McGill University, Montreal, Canada, author of "Comparative Physiology," etc. 8vo, cloth, $2.00.

The author treats his subject from the point of view of the comparative psychologist, and from the psychological standpoint several chapters of the book are devoted to hibernation and allied states, and the physical correlation to psychic development, etc.

OPPENHEIM.—The Development of the Child. By NATHAN OPPENHEIM, Attending Physician to the Children's Department of Mt. Sinai Hospital Dispensary. 12mo, cloth, $1.25 *net*.

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SABATIER.—The Vitality of Christian Dogmas and their Power of Evolution. A Study in Religious Philosophy. By A. SABATIER, D.D., Dean of the Faculty of Protestant Theology, Paris. Translated by Mrs. EMMANUEL CHRISTEN. With a Preface by the Very Reverend and Hon. W. H FREEMANTLE, D.D., Dean of Ripon. Small 12mo, cloth, 80 cents.

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